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September 23, 1935

STEEL

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FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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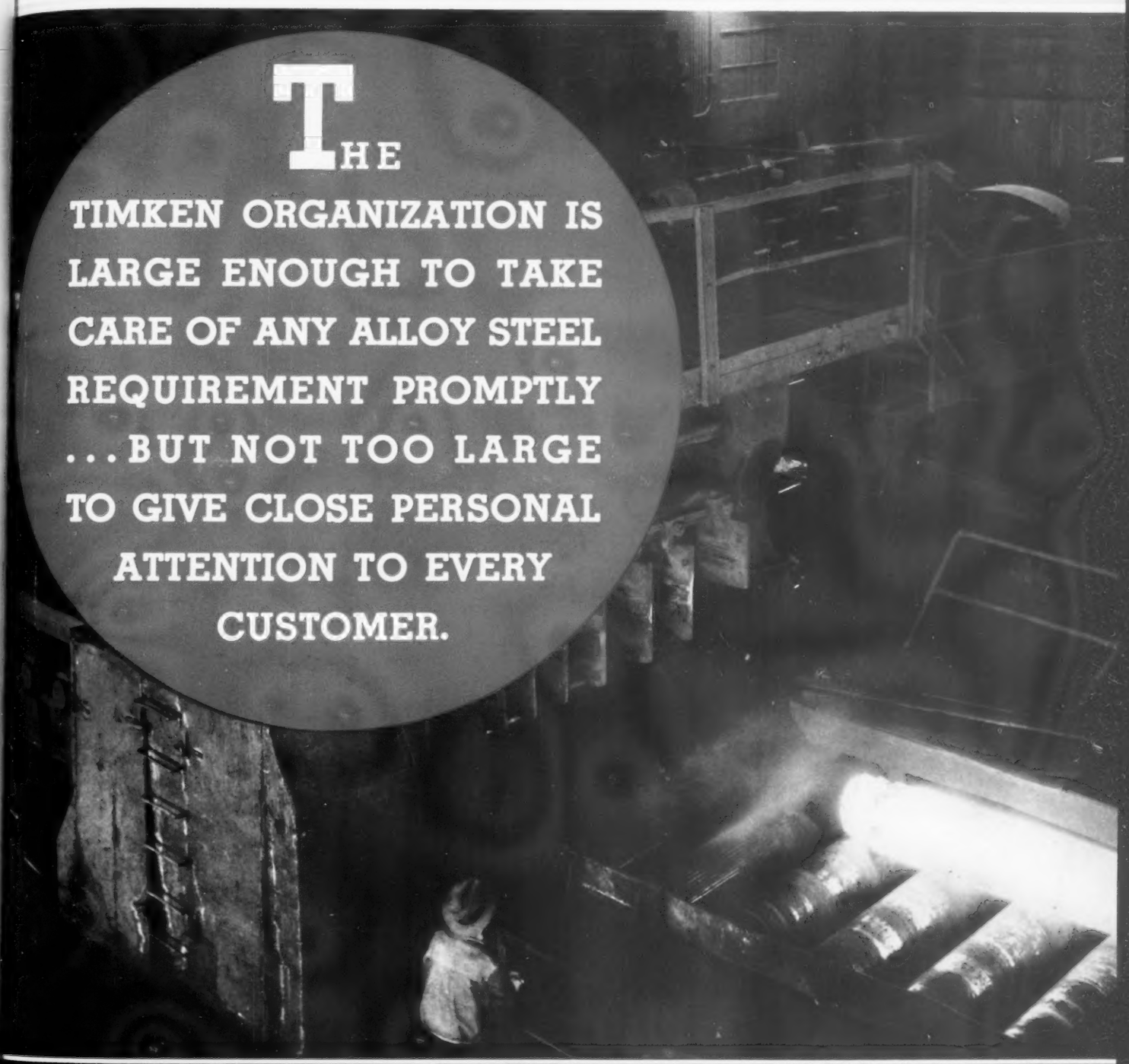

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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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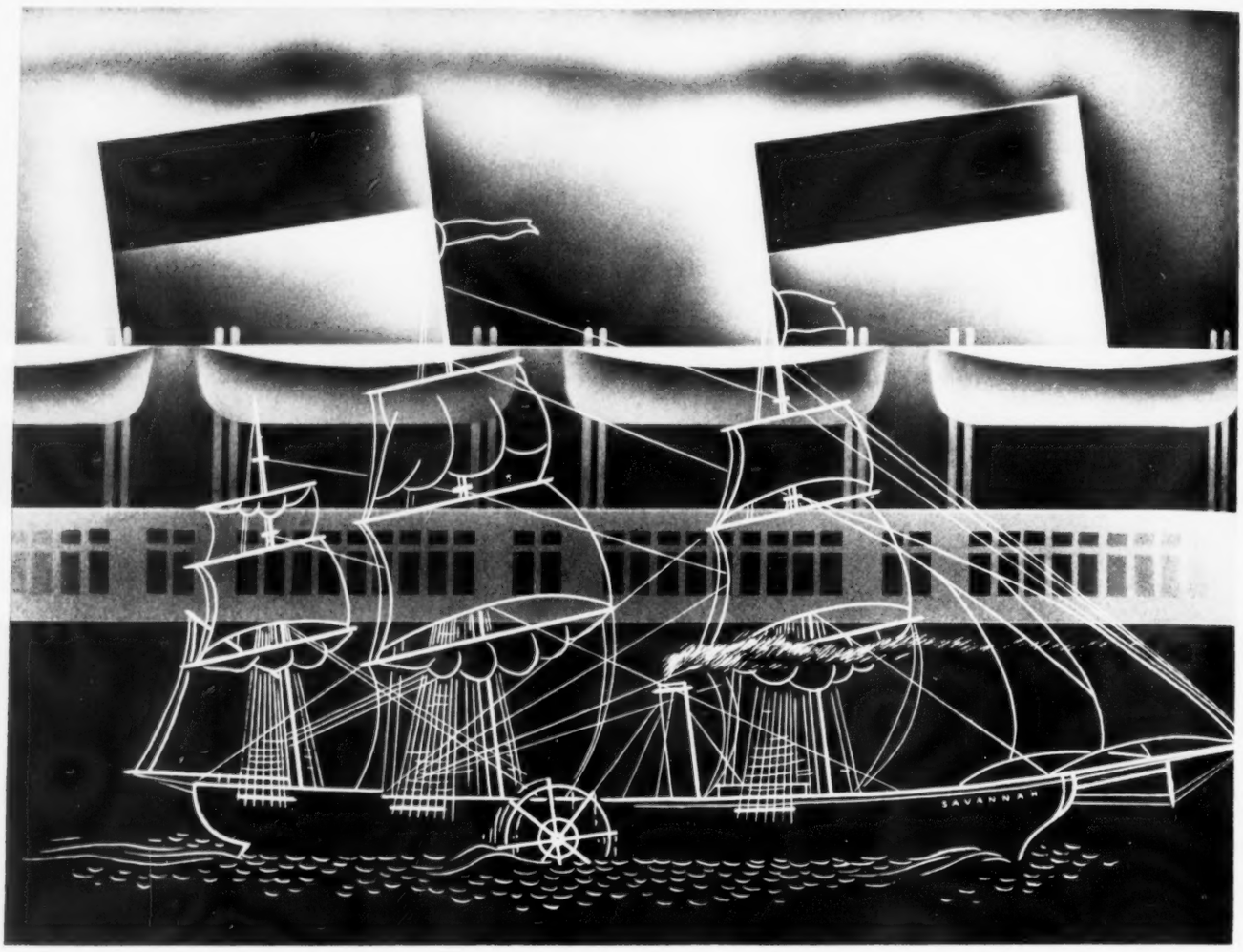


Marvel of her era . . . outclassed today

WHEN the Savannah made her epic crossing of the Atlantic she was hailed as the ultimate in steam-powered vessels. Yet such succeeding queens of the sea as the Great Eastern, the St. Louis and the Deutschland reigned under the similar popular belief that the limits of size, speed, luxury and safety in ocean liners had finally been reached. Today, even while the magnificent Normandie is ushering in another epoch in ocean transportation her alert owners are giving heed to the needs and problems the future may bring.

Steamship history has many parallels. Take steel. Since the basic discoveries of Kelly and Bessemer, steel progress has been restless with change . . . less visible, perhaps, than is possible with steamships, or skyscrapers, but gradual and pronounced nevertheless. The use of element after element has been developed to improve steel's qualities or to endow it with new properties for different purposes.

Many of such alloyed steels of the past two decades have come to be regarded as "satisfactory" for the uses they serve . . . mainly because engineers, superintendents and shop foremen have become accustomed to their characteristics. Yet change – progress – is still on the march. No advance of the past decade has been more significant than that afforded by Molybdenum. Widely proved during many years and in thousands of laboratory tests, and foundry, shop and service applications, this really unique alloying element has been found capable not only of improving practically all of steel's generally desired properties, but of enabling other alloys better to serve their particular purposes.

To engineers, metallurgists and production executives we offer these interesting books: "Molybdenum in 1934" and "Molybdenum in Cast Iron – 1934 Supplement." Also ask us to mail you our periodical news-sheet, "The Moly Matrix." Be free, too, to enlist our Detroit experimental laboratory's help at any time. Climax Molybdenum Co., 500 Fifth Ave., New York.

Visit the Climax exhibit in booths K-41 and L-42 at the National Metal Exposition, Chicago Sept. 30-Oct. 4

MOLY

CLIMAX Mo-lyb-den-um

INDUSTRY'S MOST MODERN AND VERSATILE ALLOY

As the Editor Views the News

NEW dealers have persisted in pandering to union wage earners and in ignoring stockholders. Is this policy wise politically? The American Iron and Steel institute has completed a study (p. 29) showing that the steel industry has a third more stockholders than employes. Sixty-four per cent of the stockholders own from one to 20 shares each. Only 12 per cent own more than 100 shares each. For every dollar paid in wages only 4 cents go into dividends. These figures probably are indicative of the situation in other industries. We wonder if the anti-business new dealers in Washington recognize its political significance.

• • •

"To Build, Not To Destroy"

Industry sees several ways of combating the threat of government oppression. Ernest T. Weir, speaking to industrial advertisers (p. 28), declares the next job for business men is to force "an over-ambitious administration to confine itself to rightful fields of government, and within those fields to use the power given it by the people to build, not to destroy." Obviously the remedy lies in more business in government and less government in business. Business, with all its admitted shortcomings, is less in need of reform than is government. Clearly, it is the duty of business men to take a more direct interest in politics.

• • •

G. M. Relies Upon Foremen

Destined from the beginning to be a bone of contention, the Wagner labor disputes act has been appraised as unconstitutional (p. 33) by the unanimous opinion of 59 lawyers retained by the American Liberty league. Meanwhile, as the act awaits official test in court, industry is working earnestly to improve its methods of handling problems of employer-employe relations. General Motors, one of the largest employers, is putting more and more reliance upon its foremen. Executive Vice President William S. Knudsen told listeners at the Machine Tool congress in Cleveland (p. 49) that industry "must re-establish the order of affairs where the foreman is a part of management on a broader scale. . . . We must look to the foreman to establish and maintain harmony, to represent the company and its policies to the workers." With good foremen, the Wagner act—constitutional or not—is superfluous.

• • •

U. S. S. Begins To "Simplify"

Most significant among the significant statements by officials of U. S. Steel at the Pittsburgh and Chicago luncheons (p. 24) was the explanation by General Counsel Nathan L. Miller that the new set-up is a move toward simplification. "It is always well," he added, "to do with your own hand what sometimes you might be forced to do later on and under less favorable circumstances." Point was given to this statement by the action Friday to merge six Carnegie affiliates under the name of Carnegie Steel Co. and to absorb Sharon Tin Plate Co. by American Sheet & Tin Plate Co. Here we have a hint that "simplification" may mean far-reaching changes in the corporate structure of U. S. Steel.

• • •

Show Sales Top Five Million

Machine tool builders are justly proud of the amazing success of their third show, which closed Saturday in Cleveland. Attendance exceeded 40,000 (p. 27) and sales topped $5,000,000 . . . Meanwhile the report of machine tool orders for August (p. 38) was the best since December, 1929 . . . . Now the emphasis shifts (p. 37) from machines to materials. This week in Pittsburgh steel mill engineers will discuss problems relating to equipment for producing steel. In Chicago, Sept. 30-Oct. 4, the Seventeenth National Metal congress and exhibition (p. 94) will demonstrate recent progress in the development of materials and methods . . . . STEEL presents with this issue a supplement (facing p. 52) providing a useful chart for converting hardness numbers from four widely-used scales.

E. L. Shaner

Steel Corp. Unifies Detroit Sales; Kimball Chicago Head; Millions for Modernization

UNIFICATION of activities of United States Steel Corp. subsidiaries spread from production to sales last week when the direction of sales in Detroit territory for the American Sheet & Tin Plate Co. and American Steel & Wire Co. was lodged with the Carnegie and Illinois companies, presently to come together as the Carnegie-Illinois Steel Corp.

Philip M. Guba, since last March 1 manager of sales in Detroit for the Carnegie and Illinois companies, is placed in charge of all four, although for the present at least sales will continue to be made in the names of the individual companies.

Personnel Shifts Effected

H. A. Maguire, who has been sales manager in Detroit for the Steel & Wire company, becomes first assistant to Mr. Guba. Howard V. Clark, since March 1 assistant to Mr. Guba, is second assistant. James A. Smith Jr. is appointed office manager.

While no definite statement has been made concerning other districts, it is assumed that the note of unification struck in Detroit and rumored for many months will be echoed in other large centers.

Already Carnegie and Illinois sales are generally co-ordinated in the larger cities, this also including the Tennessee Coal, Iron & Railroad Co. in the North. The other subsidiaries thus would be principally affected.

The Carnegie-Illinois corporation, which as the name indicates is the marriage of the Corporation's leading steelmaking subsidiaries, will operate as two separate divisions, at Pittsburgh and Chicago.

George Cook Kimball, since July 1, 1932, vice president of the Illinois company, will head up the Chicago division. George G. Thorp, now president of Illinois and who asked about a year ago to be retired, will step down Oct. 1 or shortly thereafter.

Up to Friday night no announcement had been made concerning the chief of the Pittsburgh division who, like Mr. Kimball, will be responsible to Benjamin F. Fairless, recently chosen president of Carnegie-Illinois. Mr. Fairless will have offices in both Pittsburgh and Chicago.

No statement had been made, either, concerning I. Lamont Hughes, now president of Carnegie.

Each division of the unified Carnegie-Illinois organization will continue to serve its natural consuming territory and its operations and plants will be expanded if necessary.

Each division also will receive directly the cash proceeds from its own sales; it will disburse payments for labor and other expenses in the territory it serves, and will make its purchases separately. The co-ordinator, of course, will be the central organization of Mr. Fairless.

This week legal steps are being taken to merge the Carnegie Steel Co. of New Jersey, the Carnegie Steel Co. of Pennsylvania, the Clairton Steel Co., the Clairton By-Product Coke Co., the Union Steel Co. and the Lorain Steel Co. into one company—the Carnegie Steel Co. This is a formality preceding the Carnegie-Illinois unification.

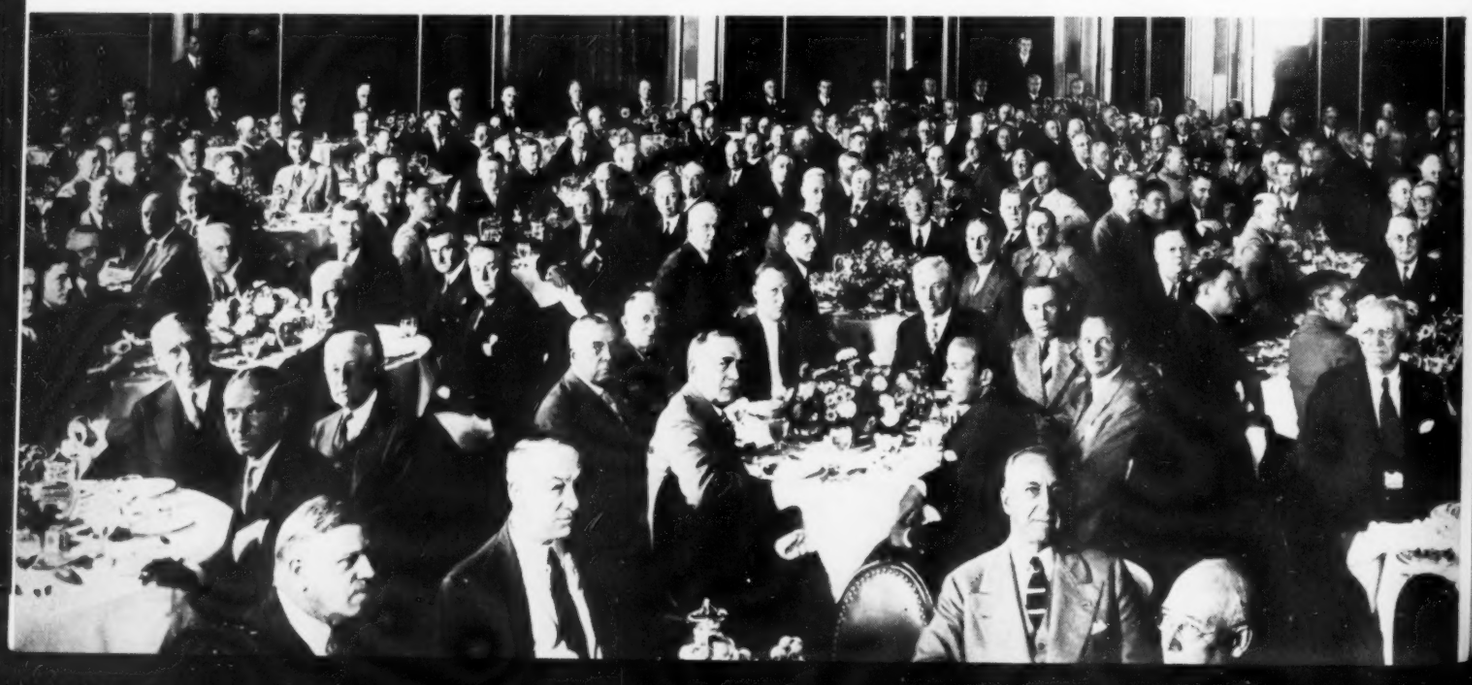
More Developments Pend

Also for purposes of simplification, the American Sheet & Tin Plate Co. is absorbing the Sharon Tin Plate Co. into its own corporate identity. Further developments are expected this week, prior to the effective date of the Carnegie-Illinois combine—Oct. 1. A leading news agency last week carried out of Pittsburgh the report that the Sheet & Tin Plate and Steel & Wire companies themselves would be brought together.

An important—though vague—development last week was the statement of Myron C. Taylor, chairman of the Corporation, that "the Corporation is at the moment spending about $70,000,000 for plant changes and betterments and will be called upon to double that amount in the near future."

A hint at one motive for revamping Corporation subsidiaries was given last week by Nathan L. Miller, general counsel for the institution,

Below is a panorama of the Steel corporation luncheon at Pittsburgh Wednesday, taken by the Trinity Court studio. A similar view of the corresponding luncheon at Chicago Thursday was not permitted to be taken



when he said that the new set-up "is more of an effort toward simplification and it may turn out that the corporation has been forehanded. It is always well to be that and to do with your own hands what sometimes you might be forced to do later on and under less favorable circumstances."

At luncheons last Wednesday in Pittsburgh and Thursday in Chicago, high officials of the Corporation formally launched the Carnegie-Illinois corporation, explained their program, and introduced Mr. Fairless, the new president, to leading citizens and customers in both cities.

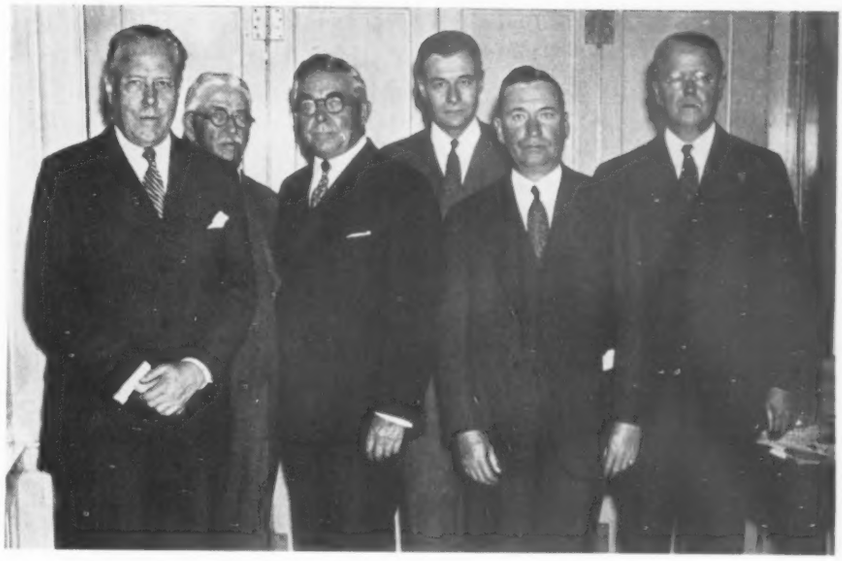
Leading Officials in Party

In the official Corporation entourage were Messrs. Taylor and Miller; William A. Irvin, president; Junius S. Morgan, a director; Edward R. Stettinius Jr., vice chairman of the finance committee; seven vice presidents—R. H. Watson, Edwin E. Ellis, John Hulst, Charles S. Belsterling, A. H. Young, Robert Gregg and Rufus E. Zimmerman; C. H. Rhodes, in charge of purchases; and Mr. Fairless.

Mr. Hughes, president of Carnegie, was toastmaster of the Pittsburgh luncheon and introduced such personages at the speakers' table as Andrew W. Mellon and William Harden Church, Eugene J. Buffington, a director of the Corporation and retired president of Illinois, functioned as toastmaster at Chicago. At the speakers' table there in addition to numerous Corporation officials were Sewell L. Avery, a director; Gen. Charles G. Dawes, and Mayor Edward J. Kelly of Chicago. At Pittsburgh were 300 guests, at Chicago 225.

At both Pittsburgh and Chicago Mr. Taylor was the leading speaker, his observations differing in substance principally to pay tribute to the local leadership instrumental in building up the Corporation in those districts.

At Chicago the late Judge E. H. Gary was lauded; the Pittsburgh district's contributions to the Corporation were said to include Andrew Carnegie, Henry Phipps, Henry C. Frick, Capt. "Bill" Jones, Charles M. Schwab, Thomas N. Miller, Thomas A. Scott, Daniel J. Morrell, Julian Kennedy, Alva C. Dinkey, Henry W. Oliver, James A. Farrell, and others.



Left to right: Myron C. Taylor, chairman of the board, United States Steel Corp.; Nathan L. Miller, Corporation counsel; William A. Irvin, Corporation president; Junius S. Morgan, a director; Benjamin F. Fairless, new president, Carnegie-Illinois Steel Corp., and I. Lamont Hughes, president, Carnegie Steel Co. Photo courtesy Pittsburgh Post-Gazette

Mr. Taylor said in part:

Since the organization of the Steel corporation great technical advances have taken place. We have witnessed particularly the gradual replacement of beehive coke ovens by by-product ovens, with substantial benefit to the industry and humanity in general, resulting from the conversion, through the by-product process, of valuable gases and products extracted therefrom—such as tar, ammonium sulphate, liquid ammonia, benzol, toluol, etc., which were previously wasted into the atmosphere. Commercial demands have also resulted in marked changes, mechanically and technically, in production methods and many of the processes in the manufacture of steel.

New Era of Merchandising

In the matter of production and marketing of steel, it is also quite probable that changes are taking place as regards heavy commodity tonnages. Some years ago it was possible to await accumulation of a fair volume of orders before putting into production of a particular kind, shape or quality of steel, thus enabling a reasonable accurate schedule of production for a long while ahead. Nowadays this is virtually impossible.

The range of products has broadened tremendously in recent years and it has been estimated that today the steel trade must stand ready to supply about 100,000 different grades, shapes and sizes of merchandise. Furthermore, there is a tendency on the part of steel consumers generally to keep their inventories at the very lowest level consistent with good business practice, secure in the knowledge that a very efficient transportation system can be relied upon to effect delivery of their requirements in short order.

The inevitable result is that the steel buyer delays making his purchases until the last moment. Though there may result from this practice a larger number of individual orders than in the past, each is relatively smaller in the volume of tonnage involved and there is such a large diversity of products specified that it is not practicable for the steel manufacturer to do any substantial amount of future planning in volume production.

Concentrate on Light Products

Under such conditions manufacturing is expensive and especially so when the demands are for highly-specialized products which can be classified as light steels, the result of American industry's effort to take the weight out of finished products.

As an illustration, it will be observed that in 1934 steel companies working under the code produced 21,174,628 gross tons of steel as against 19,243,791 gross tons in 1933, and that of this increased production more than three fourths was in sheets, strip, wire and other light products.

To meet these new conditions and in an endeavor to expand the uses of steel and to explore new fields of possible consumption, heavy capital investments are necessary. The Corporation is at the moment spending about $70,000,000 for plant changes and betterments and will be called

upon to double that amount in the near future.

Chicago was heartened by the observation of Mr. Irvin that a complete staff would be maintained to handle the Corporation's activities in the Chicago district.

"I cannot give too much praise to Messrs. Buffington and Thorp and their organization for carrying on under the most trying conditions," said Mr. Irvin.

The Chicago gathering became somewhat in the nature of a swan song for the Illinois company in view of the approaching termination of its existence as a separate subsidiary and change to a division of a new corporation whose executive headquarters are Pittsburgh.

Chicago Can Take It!

If Chicago feels that it is being slighted in the reduction of the Illinois unit to a more subservient status, it is taking the change philosophically. As a part of the Steel corporation, Illinois has not been without outside control, and the latest unification move of the parent body merely intensifies this regulation from afar.

Chicago manifests considerable local pride, but the diversity of its industries prevents one single field from overshadowing the multitude of others. This question of civic pride, it is thought by some, may react to the benefit of strictly Chicago mills, but whether the loss to the new Carnegie-Illinois unit will be consequential is debatable, since it has been observed that loyalty to the community has its limits in a large metropolis when reduced to the cold basis of service and dollars and cents.

George G. Thorp
Who retires as president of the Illinois Steel Co., at his own request, under the Steel corporation's retirement plan

George Cook Kimball
Named to head the Chicago division of the Carnegie-Illinois Steel Corp. A graduate in 1900 from Harvard, he joined the American Sheet & Tin Plate Co. in 1901. Thirty years later he was made vice president. July 1, 1932, he became vice president of the Illinois Steel Co.

Rumor New Company To Buy Canadian Steel Corp.

Rumors are current that a new Canadian corporation known as the Belgian-Canadian Steel Corp., is being organized to take over the Ojibway, Ont., plant of the Canadian Steel Corp., a subsidiary of the United States Steel Corp.

Across the Detroit river from the southern part of the Detroit district, the Canadian Steel Corp. has capacity for tin plate, galvanized sheets, and wire products. Started during the world war but never completed, are the shells of two blast furnaces and their accompanying stoves. In the slip at Ojibway the now-unused barges of the Pittsburgh Steamship Co., also a Steel corporation subsidiary, are moored.

Situated on the Detroit river, the Canadian Steel Corp. site has the same water advantages as the Hanna, Great Lakes, and Ford furnaces and steelworks which are just across the river.

Canada collects no duty on iron ore or limestone, and 99 per cent of the duty of coking coal is refunded if the coal is used for manufacturing purposes in Canada.

Carnegie To Place Mill

Carnegie Steel Co. is expected to announce the contract for its new wide plate mill at the Homestead works at Munhall, Pa., this week. The mill, which will include one stand of 4-high spreading rolls, one stand of 4-high roughing rolls, and four 4-high finishing stands, will roll plates 90 inches wide.

Transportation

MEMBERS of the Allegheny Regional Advisory board estimate that they will require 27.9 per cent more cars to load steel products originating in that territory during the fourth quarter than they did in the fourth quarter of 1934.

The advisory board's complete estimate of cars required in the district shows an increase of 7.3 per cent as an average of all commodities. The largest increase is expected to be in sanitary ware—363 per cent.

ITALY BUYS STAINLESS FOR STREAMLINED TRAINS

Italy is going ahead with streamline railroad train construction, according to an order placed with Allegheny Steel Co., Brackenridge, Pa., for approximately 8000 pounds of cold-rolled stainless strip steel, aggregating 21,000 lineal feet. The order was placed by Piaggio & Co., Genoa, Italy, according to Paul F. Voigt Jr., vice president of Allegheny.

Increased safety, lighter weight, higher speed and reduced power consumption will be permitted by the use of this metal which, he stated, is four times as strong as ordinary steel.

Piaggio & Co. placed with Allegheny last January the largest single export order for stainless steel in several years, and built a three-car streamline train of the Burlington "Zephyr" type under the supervision of engineers of the E. G. Budd Mfg. Co., Philadelphia, builder of the "Zephyr".

Philip M. Guba
Now in charge of sales in the Detroit district for the Carnegie-Illinois, Sheet & Tin Plate and Steel & Wire companies

Tool Show Blares Revival in Nation's Heavy Industries

SATURDAY at the stroke of six in the evening the curtain was officially rung down on the greatest industrial exhibition ever held in the world.

For ten days crowds the like of which has never been seen at technical shows pressed through the doors of Cleveland's Public auditorium and fanned out through the five acres of exhibits set up in the auditorium and its several annexes. And it was not simply a staring throng or a curious throng—it was a buying throng, buyers with millions in their pockets to invest in new machine tools and allied equipment.

Exhibitors figured they spent about $200,000 for space to display their machines. Sales for the ten days are reliably reported to exceed $5,000,000.

Numerous Urges To Buy

Why the sudden terrific spurt in buying of machine tools? Several reasons are being discussed. One: Impending war in Europe. The index of sales of machine tools in August rose to 125.8, a sharp increase over July. Thirty-seven per cent of this increase was accounted for by purchases of foreign countries, largely equipment for producing guns and ammunition. Skipping over the sad state of contemporary civilization which this trend reflects, nevertheless it means business for American machine builders, for many capacity operations.

Two: To maintain their competitive position, companies today are forced to buy the new, money and time-saving tools. A re-equipped competitor who is producing at a cost saving of 25 per cent is a serious factor for management to contemplate.

Three: A hedge against possible currency inflation. Money invested in new machines cannot be legislated into wallpaper.

Four: The high return on capital invested in new machinery. Government bonds at $3\frac{1}{4}$ per cent may seem like the acme of gilt-edge sound investment, but a new turret lathe that will show a 20 per cent return on the investment in a year's time is no cat-and-dog security.

Five: For the past six years the smartest machine designers in the world have been laboring overtime to evolve new principles of construction and operation which have so definitely outmoded old tools that to operate the latter any longer is being considered by many a form of economic suicide.

There are other reasons, but these will suffice to explain the buying deluge at Cleveland. Over forty thousand representatives of industry from all over the world, who were in attendance at the show, are testimony to the urgent need for new equipment.

Getting back to the show itself, it is difficult to express in mere words the awesome and impressive sweep of the picture it presented. To get the perspective, an observer might well have first gone up to the stage of the auditorium where a stalwart file of machine veterans had been set up, through courtesy of the Edison institute. Here were tools which represented the best thinking of designers of 1860. They were the last word in the modern machine shop of Civil war days. Handsome scroll effects in cast iron adorned their legs, bases and headstocks. Lathes and drills of a cobwebby era, disinterred from their graves, they gave strange contrast to the hundreds of modern tools around them.

Turning from these patriarchs, one could get a better realization of the tempo of the times reflected in other exhibits. To this observer, the new machines emphasized, first, utility; second, ease of operation; third, beauty of line. It would be impractical and, in fact, impossible to explain the many features embodied in new equipment to facilitate doing a job better, faster and at less cost. In previous issues STEEL's editors have given complete details of all new machines shown.

Difficult To Appraise Fully

It was estimated that to walk completely through the show, around each individual exhibit, would require covering a distance of 21 miles. This probably explains why many who had planned to spend one day there were forced to prolong their visit two or three days. Even then, it is likely that many of the important and unusual displays were missed or not fully appreciated.

The machine tool industry may well be proud of the spectacle which it unfolded for industrial America and the industrial world. And in addition to feeling proud, exhibitors certainly do feel well repaid, from the standpoint of sales and inquiries, for the heavy expenditures involved in shipping their trainloads of tools and exhibiting them at this greatest of all industrial pageants.

The fanfare has died, but it will be a long time before manufacturers will have lost their revived interest in re-equipping and modernizing.

PATHFINDERS OF INDUSTRY AT SHOW: Ambrose Swasey, pioneer machine tool builder and chairman of the Warner & Swasey Co., Cleveland, stands to the left of Col. E. A. Deeds, chairman of the board of Pratt & Whitney Co., Hartford, Conn., and the National Cash Register Co., Dayton, O., as they inspect the model of the McDonald observatory, central feature of the Pratt & Whitney-Warner & Swasey combined exhibit at the Machine Tool Show in Cleveland last week.

Self Preservation Impels Business Into Government

By Ernest T. Weir

Excerpts from an address delivered by the chairman of the National Steel Corp., Pittsburgh, before the thirteenth annual convention of the National Industrial Advertisers' association in Pittsburgh, Sept. 18

I WILL speak on what I consider the most important single problem confronting all business men today. This problem is the vital one of government in its relationship to business and to the country at large.

A few years ago, business men gave little thought to government in its direct relationship to business, except as they were concerned with imports, exports, tariffs, interstate commerce, or some of the few other business functions in which government was a major factor.

Today, government is an omnipresent factor. You can hardly turn around without being elbowed by some rule, regulation, executive order, or dictum which you must take into consideration. It is painfully apparent to all of us that government now has its hand in business. I believe it is equally apparent that, unless strong, intelligent, and widespread opposition develops soon, government, of a kind we have never before seen in America, may have both hands on business and perhaps on everything else.

A Job for Business

Common sense dictates that we use every legitimate means at our command to force an over-ambitious administration to confine itself to rightful fields of government, and within those fields to use the power given it by the people to build, not to destroy. This must be the next step for business men.

The Roosevelt administration departs widely from our tradition. It says that the system has enabled a few individuals to amass great wealth and great power and to use this wealth and power, alone and in combination with other similar individuals, to solidly intrench their position at a serious disadvantage to the vast majority of our people.

As a solution, the administration demands that all power be placed in its hands, so that its men of celestial vision, unsullied by the least taint of practical experience, can administer this power with a nicety that will take all of the kinks out of our economic mechanism and bring benefits that will cause the people to dance in the streets with joy.

Confusion, inefficiency, and vacillation have been characteristic of many administration actions. But in one line of action and policy there has been none of these. With unswerving purpose, it has driven straight toward its goal. That goal is the concentration in the executive branch of the federal government of complete authority over every economic pursuit.

Conceived by the American Federation of Labor, and jammed through as a weapon to force the total unionization of industry, the Wagner bill was ostensibly designed to give labor the right of collective bargaining—a right it has always had and exercised. If constitutional, the federal government, for the first time, will have complete control over all employer-employe relationships.

Ernest T. Weir

The Guffey bill is designed to stabilize the bituminous coal industry, yet it is almost certain to raise costs and give an advantage to competing fuels. A producer has the theoretical right to operate outside of this law, but over his head is a taxing provision that will ruin his business if he fails to comply. If constitutional, this law would place the coal industry, and by application of its principle, every other industry under control of the federal government.

Under the AAA, one man, the secretary of agriculture, has sole authority to determine the kinds and amounts of farmers' crops. He can tax handlers of agricultural commodities, and turn the tax funds over to the farmers, thereby determining how much farmers shall receive . . . and by the same action, how much housewives shall pay. This law places economic power over a large and important group of our population in the hands of the federal government.

Material progress, now as always, depends upon increasing production and wider distribution of goods. This production and distribution has been stimulated more under our system than under any other evolved by man. Our best hope of progress is not in the overturn of this system but in its maintenance and operation to encourage a larger expansion and greater development of industry. We know this system, we have seen it in action through long years, and we have seen it produce a real and a recurring new deal for each succeeding generation of Americans.

What are the real implications of the actions of the Roosevelt administration? One of its basic positions is that, under our present economic system, business men have the freedom to determine their own economic actions, and that since each strives for his own gain, supposedly regardless of the general welfare, he causes dislocations which eventually break down our economic machinery. With sufficient power, it is assumed that government could place checkreins upon business that would keep it on the track.

Manifestly Impossible

It is apparent that government could do this only if three things were true:

First, it would need to have a personnel with an economic intelligence superior to the combined intelligences of business men throughout the country.

Second, these officials would have to be motivated by considerations in which personal, social, and political influences played no part.

Third, government power could not be confined to the economic field, but would have to be extended to every other field and over every individual in the country.

The Roosevelt administration is exerting an influence against the best interests of the country, not only in leading away from American principles, but also because these same actions delay real recovery. Were it not for this attitude of the administration, I would have every confidence in the immediate future. The forces of recovery are evident throughout the world. I am positive that the United States would have been much further along in its upward climb, had it not been for this oppressive governmental influence.

Stockholders in Iron and Steel Outnumber Employes

AT THE close of 1934 the number of stockholders in the iron and steel industry was 490,851, or practically one-third more than the number of employes, which was 369,364, states the American Iron and Steel institute, New York.

This is based on reports from 158 companies representing 96 per cent of the steel ingot and finished steel making capacity of the country and 93 per cent of the pig iron capacity.

Complete data from companies representing 93 per cent of the ingot capacity and 95 per cent of all stockholders include: Number of stockholders, 470,464, of whom 59.5 per cent are men; total number of shares, 39,690,826; number holding 1 to 20 shares, 301,002 or 64 per cent; number holding 21 to 100 shares, 111,223 or 23.6 per cent; number holding over 100 shares, 58,239 or 12.4 per cent; number of employes holding 1 to 20 shares, 71,944.

Net Up 22 Per Cent for Half

Net income of these 158 companies aggregated $30,923,927 after all charges in the first half of 1935, an increase of 22 per cent over the $25,305,232 net income of the same companies in the first half of 1934.

The net income in the first half of this year represents a net of approximately $2.20 per ton on the 14,000,000 gross tons of all iron and steel products produced for sale. In the corresponding period of 1934 the net income of the companies represented approximately $1.70 for each of the 15,060,000 gross tons of products produced for sale.

Earnings before interest charges but after depletion and depreciation in the first half of 1935 represent a return of 1.04 per cent on the aggregate of $4,676,993,912 invested in the 158 companies. This compares with earnings in the first half of 1934 of 0.91 per cent on an investment of $4,742,712,664. Over the whole of last year 0.48 per cent was earned on the investment.

Although the rate of operations of these companies in the first half of 1935 was slightly below the rate in the first six months of 1934—46.7 per cent of capacity this year as against 47.1 per cent in 1934—total payrolls of the companies went up more than 8 per cent.

During the first six months of 1935 payrolls of the 158 companies aggregated $346,151,525, which compares with payrolls of $319,989,331 in the first half of last year. Largely responsible for the greater payrolls in the first half of this year is a 10 per cent increase in wage rates which went into effect in April, 1934. For the whole of 1934, the companies' payrolls aggregated $585,765,032.

Dividend payments of $13,376,001 in the first 6 months of this year represented approximately 4 cents for each dollar in payrolls. In the first half of last year dividend payments of $9,807,023 represented only 3 cents for each dollar of payrolls. Over the entire 12 months of 1934 for every dollar going into payrolls, less than 4 cents was paid out in the form of dividends.

MAY CLEAR BACK DIVIDENDS

Directors of the Youngstown Sheet & Tube Co., Youngstown, O., at their October meeting are expected to discuss plans for clearing up back dividends on the preferred stock. One plan contemplates immediate payment of $10 in cash and the right to convert preferred into common on the basis of 1 for 4. The other plan involves the payment of all back dividends on the preferred in additional preferred shares, of which 100,000 have been authorized but not issued.

FOLLANSBEE DEFICIT IS SMALL

Follansbee Bros. Co. trustees' balance sheet as of July 31 shows loss for the first seven months of 1935 amounting to $1448 and loss for the period from May 11, 1934, to Dec. 31, 1934, of $2566.

As of July 31, there was $189,197 cash, $281,339 in accounts receivable, and $1,707,313 in inventories. At that date, accounts payable were $215,937 and deferred notes and accounts payable $607,245. Trustees' certificates outstanding, with accrued interest, amount to $201,708.

PITTSBURGH STEEL CO. RATIO IS OVER 6 TO 1

Pittsburgh Steel Co., Pittsburgh, reports loss of $1,675,353 for the fiscal year ended June 30, compared with net loss of $1,330,390 for the fiscal year ended June 30, 1934. Results of operations for 1935 showed operating profit of $62,470 after deducting charges for repairs and maintenance of $1,860,000, as compared with operating profit for the previous fiscal year of $414,835 after charges for repairs and maintenance of plants of $1,670,000. Balance sheet shows current assets as of June 30, 1935 of $11,444,968, as against current liabilities of $1,786,951, or a ratio in excess of six to one.

CATERPILLAR MAKES $3,863,039

Caterpillar Tractor Co., Peoria, Ill., reports net profit of $3,862,039 in the first eight months of 1935, equal to $2.05 per share. Net sales in the first eight months totaled $24,844,545. August net profit was $502,336.

TIMKEN-DETROIT NET HIGHER

Timken-Detroit Axle Co., Detroit, reports profit of $397,425 in the first half of 1935, compared with net of $204,729 in the first half of 1934.

DIVIDENDS DECLARED:

Standard Steel Spring Co., Coraopolis, Pa., 25 cents Oct. 1 to record of Sept. 27.

Westinghouse Air Brake Co., Wilmerding, Pa., 12½ cents Oct. 31 to record of Sept. 30.

Signode Steel Strapping Co., Chicago, to pay $9 on its deferred accumulation, in the form of 10-year 3¾-per cent convertible notes, Oct. 15 to record of Aug. 19.

Electric Auto-Lite Co., Toledo, O., 30 cents Oct. 1 to record of Sept. 27. This is the first common dividend since Jan. 2, 1933.

How Iron and Steel Fared in Past Three Half Years

	Jan. to June 1935	Jan. to June 1934	July to Dec. 1934
Total income	$110,646,066	$105,307,390	$ 38,186,380
Interest charges	17,615,232	17,773,622	17,403,436
Depletion and depreciation	62,106,907	62,228,536	58,829,667
Net income	30,923,927	25,305,232	*—38,046,723
Cash dividends paid	13,367,001	9,807,023	12,994,012
Total wages and salaries	346,151,525	319,989,331	265,775,701
Rate of operations (companies producing ingots only)	46.7%	47.1%	26.6%
Earnings before interest but after depletion and depreciation	48,539,159	43,078,854	*—20,643,287
Per cent earned on investment	1.04%	0.91%	*—0.44%

*Deficit.

Production

STEELMAKING surrendered 2 points last week, sliding back to 52 per cent. A factor in this decline is a slight letup in automotive releases, due to most manufacturers being in the changeover period. Declines at Pittsburgh, Youngstown and New England more than offset slight gains at Buffalo and Birmingham, while other districts retained recent gains. Details follow:

Youngstown—Off sharply to 54 per cent, a loss of 3 points. Tentative schedules indicate a further recession this week.

Detroit—Unchanged at 94 per cent, one interest continuing to operate all eight open hearths, while another is melting in eight out of nine.

Wheeling—For the third successive week, ingot operations here are unchanged at 84 per cent. Out of 37 open-hearth furnaces in the district, 31 are on active schedule. One mill is operating at better than 90 per cent.

Pittsburgh—Off two points to 46 per cent last week, due to retrenchment of the leading interest which closed the week at about 40 per cent, as compared with 45 per cent the week previous, and an independent mill closing down one small open-hearth department temporarily last week. However, releases against automotive steels are expected to improve materially over the balance of September and the ingot rate should reflect itself in an upward move shortly.

Twenty-four steel works blast furnaces remain active, Carnegie Steel Co. having 10 of 32 on; Jones & Laughlin Steel Corp., 7 of 11, Bethlehem Steel Co., 3 of 7, and Pittsburgh Steel Co., Pittsburgh Crucible Steel Co., American Steel & Wire Co., and National Tube Co., 1 each.

Chicago—Averaged slightly under 60 per cent the past week, about 59½ per cent. The volume of sales and specifications points to a continuation of steady schedules during the near future. Thirteen of the district's 36 steelworks blast furnaces continue active.

Central eastern seaboard—Unchanged at 35 to 36 per cent, with minor variations at some plants being offset by changes at others. The general trend appears upward.

Cleveland-Lorain—Steady at 67 per cent, National Tube Co., Lorain, operating 12 open hearths, Corrigan, McKinney Steel Co., nine, and Otis Steel Co., five. At Lorain the bessemer converter and rail mill were idle, and finishing mill operations were lighter, skelp, lap and seamless mills being idle, while two butt mills were operated. Sheet mill operations at Cleveland and Monroe, Mich., averaged 65 to 75 per cent.

New England—Down 5 points to 68 per cent last week, one steel works taking off an open hearth unexpectedly. Operations will be at least maintained at 68 per cent this week with a possible slightly higher rate.

Buffalo—Gained 2 points to 37 per cent last week, with 15 open hearths active. For this week operations are expected to go to 45 per cent if tentative schedules are carried out. Production this month will be the best of the quarter by a considerable margin.

Birmingham—Up 1½ points to 50 per cent, with indications of a slight increase this week.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Sept 21	Change	Same week 1934	Same week 1933
Pittsburgh	46	— 2	16	34
Chicago	59½	+ ½	22	44
Eastern Pa.	35½	None	17	35½
Youngstown	54	— 3	26	48
Wheeling	84	None	26	72
Cleveland	67	None	28	54
Buffalo	37	+ 2	21	48
Birmingham	50	+ 1½	25	50
New England	68	— 5	28	86
Detroit	94	None	77	55
Average	52	— 2	22½	40

SHEET ACTIVITY SHOWS GOOD GAIN IN AUGUST

Daily average steel sheet sales reported by the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, increased to 6720 net tons in August, from 4694 tons in July. Shipments advanced to 6030 tons from 4908 tons. The sales in July, as previously recorded, were nearly 50 per cent ahead of those in June. In August they rose to 6905 tons daily from 6655 tons in July.

Totals for the month: Sales 207,140 tons; production 206,613 tons; shipments 180,893 tons. Total sheet capacity in the country for August was approximately 500,000 tons, and the association's report is based on a capacity of 302,500 tons.

Announcing "Power Drives"

STEEL announces a new department to be devoted to the broad subject of Power Drives. Cost of power is a large item in the overhead in the setel producing and metalworking indusdustries. In this new feature STEEL will seek to help you solve your drive and transmission problems and to obtain greater efficiency in your use of power. Various types of drives and the factors, equipment and accessories involved will be discussed.

Watch for the initial appearance of Power Drives in STEEL of Sept. 30 and for its regular inclusion in all issues thereafter.

—The Editors

Safety Council Metals Program

PROGRAM for the metals section of the National Safety council convention to be held in Louisville, Ky., Oct. 14-18, has been prepared by the following officers of the section:

General chairman, J. A. Voss, Republic Steel Corp., Youngstown, O.; vice chairman, H. W. Darr, Bethlehem Steel Co., Johnstown, Pa.; vice chairman, A. Berquist, Youngstown Sheet & Tube Co., East Chicago, Ind.; vice chairman in charge of health, Dr. R. C. Engel, Corrigan, McKinney Steel Co., Cleveland; and secretary and news letter editor, C. M. Allen, American Rolling Mill Co., Middletown, O.

The program follows:

MONDAY AFTERNOON

Oct. 14, Kentucky hotel

Mezzanine floor, Parlors B-C-D

2:00 Progress of the metals section.
General chairman, J. A. Voss.

2:15 Address.
Frank A. Morrison, personnel manager, Kelvinator Corp., Detroit.

2:45 Discussion.

3:00 Safe use and handling of gases in the steel industries.
George T. Williams, superintendent, blast furnaces and coke plant, Youngstown Sheet & Tube Co., East Chicago, Ind.

3:30 Discussion.

WEDNESDAY MORNING

Oct. 16, Kentucky hotel

Mezzanine floor, Parlors B-C-D

9:45 Experience facts in the metals industries.
Charles W. Hanko, Safety Director, Pittsburgh Steel Co., Monessen, Pa.

11:00 Discussion.

11:15 Election of officers.

11:25 Data on the 1934-35 safety contest.
General chairman, J. A. Voss.

11:40 Presentation of awards.
An Officer of the National Safety council.

THURSDAY MORNING

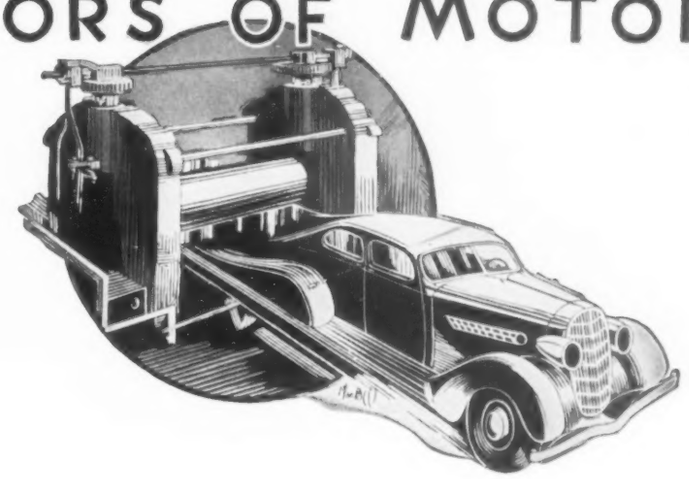
Oct. 17, Kentucky hotel

Mezzanine floor, Parlors B-C-D

9:45 Maintenance kinks in the metals industry.
(Illustrated).
John A. Oartel, chief of safety bureau, Carnegie Steel Co. Pittsburgh.

10:45 Your Hour.
Led by T. H. McKenney, Supervisor of labor and safety, Illinois Steel Co., South Chicago, Ill.

MIRRORS OF MOTORDOM



DETROIT

AFTER all, Chrysler is going to the steel top. Believed early in the year to be committed to it, in midsummer it was officially stated that the soft top would be retained, but superior appearance and the increasing disposition of the public to associate steel with safety have now won the decision for steel.

Briggs has a fat slice of this increased Chrysler business, and one result is to augment its offerings of scrap and enhance its position in that market. Like Nash-Lafayette but unlike General Motors and Hudson-Terraplane, the Chrysler top is several stampings welded, but the ultimate product is the same—a one-piece top in appearance and safety.

Important Gain for Steel

There will be others in the steel-top category by the time all 1936 models have been introduced. This constitutes the most important gain made by iron and steel from the standpoint of consumption in new models. In two other important directions—pistons and radiator grilles—competing materials have scored.

With all General Motors lines going from cast iron to aluminum alloy pistons for 1936, only Willys will be using cast iron, and the future of Willys is extremely uncertain. Ford will start the model year with aluminum pistons, but continues to make its new cast alloy steel pistons, which are practically as light as aluminum and a marvel of foundry practice, on a small scale.

In radiator grilles, the die-cast zinc alloy type which Olds pioneered this year is sweeping the field. This type truly represents a concession on the part of automobile manufacturers to beauty, because die-cast grilles cost up to $5, or about four times the cost of a comparable grille in pressed steel.

Ternstedt, General Motors subsidiary, is so pressed turning out these new grilles for other General Motors lines that the two Cadillac jobs have been placed with Doehler at Toledo. In addition to Cadillac, Doehler is casting four grilles for Chrysler, two for Nash, and one each for Reo, Pierce-Arrow, and Studebaker—a known total of 11.

For the Chrysler lines the shift to die-cast radiator grilles and steel tops represents the outstanding design changes. However, at least in DeSoto the newly-designed beautiful interiors will be featured.

The DeSoto airstream series will come out with striking interior appointments indicating that Chrysler will put behind it sales pressure comparable to what General Motors proposes for the Special Buick, which is the successor to the 1935 Buick "40."

There will also be new styling in the DeSoto hood, and in the new radiator grille the flow lines of the fin will be horizontal rather than vertical.

The program adopted for DeSoto confirms the expectation that the competition in the price bracket delivering for $750 to $1000 will be intense. It will be dog eat dog with Dodge, DeSoto, Olds, Pontiac, Special Buick, Hudson, and some Nash, and Studebaker series.

This intensified marketing effort will be characterized by splitting up some Chrysler dealerships and putting DeSoto on its own. There also will be some divorces in the Buick-Pontiac dealer family, as the quotas set for some Buick dealers are so high Pontiac might suffer.

While dealers and newspaper automobile editors are trekking to Detroit and nearby automobile centers for luncheons and cocktails on the companies, followed by a highly-confidential glimpse at new models, which in some cases have been hand assembled, it looks as if the last ten days of October is the period in which formal announcement of most of the new jobs will be made.

Buick, as previously noted, will lead the procession, probably unveiling its new Special, Century, Roadmaster and Limited series next Saturday. Buick last week got its production up over 350 units daily, five days a week.

Ford Making Shift

Ford, which seems pretty certain to stake all on one line, is in the changeover period. Some branches continue to assemble 1935 units. Much of the experimentation done with smaller engines at the Rouge plant and Dearborn laboratory last year appears to have been for the foreign subsidiaries, selling in markets where taxes and gasoline are higher than in this country.

It would be following precedent for Mr. Ford one of these days to corral priceless first page space, to the discomfiture and jealousy of his competitors, by announcing he will make a stated number of cars—presumably well over a million—in the coming model year.

Chevrolet also is in the changeover period, although the various departments are gathering momentum on parts, and assembly of the 1936 series will get under way within ten days. It still is a good bet that hydraulic brakes, a revised hood and a new radiator grille will be the chief

15 Leading Auto Makers

		8 Mo. 1935	8 Mo. 1934
1.	Ford	971,400	632,003
2.	Chevrolet	760,720	692,477
3.	Plymouth	313,936	305,952
4.	Dodge	208,324	125,130
5.	Oldsmobile	127,039	69,490
6.	Pontiac	126,203	71,761
7.	Hudson-Terraplane	71,168	73,135
8.	Nash-LaFayette	56,820	26,893
9.	Buick	42,275	68,298
10.	Studebaker	37,631	38,785
11.	Chrysler	36,755	32,332
12.	Packard	30,052	3,625
13.	DeSoto	19,948	12,824
14.	Graham	17,824	13,851
15.	Cadillac-LaSalle	13,255	11,242

—Cram's Reports

departure for Chevrolet the coming year.

Olds started its assembly line on the 1936 series last Tuesday, at the initial rate of 50 a day, five days.

Lincoln has also started on its new series, with rumors concerning the $1200 V-12 still numerous but no actual proof forthcoming from the company.

Excepting Graham, Packard and Reo, the other Michigan automobile manufacturers, including Hudson-Terraplane, Hupp, Pontiac, DeSoto, and Dodge, were not in actual production or doing more than assembling a few hand-made jobs, but in every case a start is imminent.

Contrary to the belief of some, Cadillac is not expected to compete with Packard and possibly also Lincoln in the price field just above $1000, but it apparently is proposing to campaign heavily in the $2500 market. The Cadillac V-8 in this price class will be shorter and lighter; the heavier line will carry the Fleetwood bodies.

Production Still Restricted

Last week's production of cars and trucks, at 12,600, compared with 13,470 units the first week preceding and 34,140 the second, indicating that assemblies still are scraping bottom. The total for all General Motors was 5100, chiefly Buick; for Chrysler 1500, principally Dodge trucks; and Ford none.

An earnest of returning prosperity, which is also helpful to steel, is the experience of Plymouth in increasing its sales to police departments. Over the past year numerous cities have replaced their old police cars with latest models. Plymouth more than doubled its police business in the past year, adding 56 police departments to its clientele.

Plymouths are now available with bullet-resisting windshields, gun ports, bullet-resisting side wings, radiator guards, and tire guards. The dash, cowl, headboard, toeboard and both front door panels are lined with lightweight armored steel. This protection will stop a bullet from a 0.45 caliber machine gun.

At least one automobile manufacturer is anxious to have the automobile license year moved up to accompany the earlier introduction of new models.

In the past, the license year beginning Jan. 1 coincided more or less with the shows. Now, with the New York show starting Nov. 2, it is feared that some prospective buyers may hold off until January rather than be inconvenienced by transfering old tags.

Some states have postponed the purchase of 1936 tages to April to lighten the financial burden at holiday time, and this is considered a further handicap to new sales.

One manufacturer, who is sensitive about any announcement prior to the showing of its new models, is tilting its instrument board at an angle of 45 degrees, bringing it into the same plane that a book or a newspaper would be held . . . . Among recent companies to book substantial Chrysler business is the New Process Gear Corp., Syracuse, N. Y., which expects to employ more than 1000 men for full-time operations beginning Oct. 1 . . . . Chevrolet set an all-time record for truck sales in a single month when it delivered 21,776 trucks in the United States in August . . . . While the trend toward aluminum pistons has practically extinguished cast iron for the time being, cast iron cylinder heads will show no such slump . . . . General Motors is expected to resume its Sunday evening orchestra broadcast in October, just prior to the big fanfare on new models. . . . Ford is again sponsoring World Series broadcasts over the national networks.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,320
July	229,357	264,933	337,049
Aug.	232,855	234,811	*220,000
8 mos.	1,442,326	2,214,007	2,819,193
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Sept. 7	34,140
Sept. 14	13,470
Sept. 21	12,600

Meetings

WESTERN division of the American Mining congress, Washington, has scheduled its annual convention and exposition at the Palmer house, Chicago, Sept. 23-27. On the program are: Clarence B. Randall, vice president, Chicago, and R. D. Satterley, superintendent, Morris mine, Ishpeming, Mich., Inland Steel Co.; Dr. C. K. Leith, vice chairman, planning committee for mineral policy, national resources board; Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt.; William Conibear, Cleveland-Cliffs Iron Co., Cleveland; George Martinson, Stephen Royce, and Herbert C. Jackson, Pickands, Mather & Co., Cleveland; E. W. Davis, superintendent, mines experiment station, University of Minnesota.

A. G. A. MEETS OCT. 14-17

American Gas association has scheduled its seventh annual convention for Chicago, Oct. 14-17. P. S. Young is president. Alexander Forward is managing director at 420 Lexington avenue, New York.

FOUNDERS GO TO NEW YORK

National Founders association has called its 1935 meeting for the Waldorf-Astoria hotel, New York, Nov. 20 and 21. J. M. Taylor, 29 South LaSalle street, Chicago, is secretary-treasurer.

CGreat Lakes Regional Advisory board will hold its fortieth regular meeting in the Book-Cadillac hotel, Detroit, Sept. 25, beginning at 9:15 a.m.

Labor

IN POLITICAL primaries held at Pittsburgh Sept. 17, two Carnegie Steel Co. employes won the Republican city council nominations in Clairton. Polling 622 votes, William J. Spang, "rank-and-file" steel labor leader, surprised party leaders on the same day by taking the largest vote of 12 candidates on the Democratic ticket for Duquesne, Pa., city council.

AGAIN ADVERTISE FOR LABOR

Carnegie Steel Co. is believed to have inserted the first advertisement for steelworks labor in a number of years in the Pittsburgh district when, ten days ago, it used the classified columns of Pittsburgh newspapers to solicit applications from experienced axle rough turners, required to turn out its order for 7000 axles for Soviet Russia.

SCULLIN ADDS 200 MEN

Scullin Steel Co., St. Louis, recently increased its working force by 200 men, making the total 600.

Foreign Trade

EXPORTS of iron and steel products in August, as compiled by the metals and minerals division of the department of commerce, totaled 247,312 gross tons, compared with 296,802 tons in July. Scrap exports in August were 156,685 gross tons, a sharp decline from the July total of 205,779 gross tons. Trade, otherwise, is being well maintained.

WINDOWS OF WASHINGTON

WASHINGTON

NOW that congress is out of the way and High Moguls of the NRA no longer have to kowtow, they don't quite know whether or not to take themselves seriously. And, they don't know how seriously to take the letter of the President, sent to congress just before adjournment, proposing "an industrial statute of broad importance"—perhaps a new NRA.

One of the interesting phrases in the letter showed that it had been prepared weeks before it was sent to congress, and there is some inside talk that he signed the letter inadvertently and that he had no intention of letting it go when it did.

Joke or Mistake?

The letter was delivered on the day congress was to have adjourned, and the President stated that he did not think that congress would have time to enact permanent legislation then, but that it should at the next session.

Either the President has a highly-developed sense of humour or else he did not intend to send the letter. Besides, he would not have been jesting with congress in just that way at just that time. It was no jesting time.

So—where does that leave the rear guard at NRA?

Again, Laurence Martin, the present administrator, not only has lost the front page of the daily papers but he has practically never seen any page of any paper. He has had no press conference since he took office and has instructed one NRA official with whom iron and steel has much in common that he is not even to talk to newspaper men. Thus has the goldfish bowl become clouded.

R. W. Shannon, NRA executive in charge of the steel industry study, has now been officially designated as contact man for the NRA review division with the steel industry in connection with this survey. This was needed, it is explained, because all kinds of queries started going out from several different divisions of NRA asking for steel information, and all will now be co-ordinated through Mr. Shannon. It was also necessary to do this in the case of the other industry studies.

Stories have been printed in some daily newspapers to the effect the American Iron and Steel institute has refused to co-operate with NRA in these studies. This is denied at NRA. In this connection officials there point to a letter from the Institute of Sept. 13 in answer to a request for information in which the Institute specifically states that it wants to co-operate to the fullest.

Of course, this is the only smart thing to do because it is reported that where industries do co-operate they will have a chance to see the final reports before they are made public and they may be able to soften any blow—if any is intended. This co-operative attitude is being taken by most of the industries, but there are a few which have kicked over the traces, such, for instance, as the automobile industry.

SETTING UP 3-MAN LABOR BOARDS IN 21 CITIES

The national labor relations board, although just getting under way, is making a setup consisting of a system of a three-man regional agency in 21 cities to handle complaints.

It was stated at the board last week that there is no chance that individual boards will be set up for various industries, such as steel.

The board announced that offices will be maintained at Pittsburgh, New York, Boston, Philadelphia, Baltimore, Atlanta, New Orleans, Detroit, Cleveland, Cincinnati, Chicago, Milwaukee, Minneapolis, St. Louis, Kansas City, Fort Worth, Los Angeles, San Francisco, Seattle, Indianapolis, and Buffalo.

Under this proposed setup, the board discards regional labor boards as courts of original jurisdiction in handling collective bargaining cases.

Under the procedure in the new rules and regulations, after an employe or a union files a violation complaint, the regional director is to investigate.

If he finds the complaint justified, he is to make a formal complaint in the name of the board. The trial examiner then is to take testimony, with the regional attorney representing the regional director at the hearing.

Provisions for Appeal

The examiner will recommend either that the employer be cleared or that he be ordered to "cease and desist" from the practice which the employe or union charges.

Either side may appeal from the examiner's recommendations to the national board, with an opportunity for argument on the testimony before the national board. Any employer appeal from the national board's order will go to a circuit court of appeals.

Incidentally, 59 lawyers retained by the American Liberty league to review legislation passed by congress reported unanimously last week that the Wagner act is unconstitutional. Earl F. Reed, counsel for the Weirton Steel Co. when it beat section 7a of NIRA, chairmaned the committee.

SECURITY BOARD NO WORRY FOR STEEL INDUSTRY—YET

Eventually the steel industry is going to be very much interested in the work of the social securities board, but it is too early now.

The board is trying to function under Government Winant, with no appropriation up to this time of any kind—a tribute, or not, to the late Huey Long, who filibustered the deficiency bill to death.

The board is functioning, if you can call it that, with borrowed desks,

borrowed clerks, and borrowed everything.

It is the thought of the President that the board can make as much of a setup as possible up to the time congress convenes in January, and then be ready to go ahead full steam as soon as some money is available for that purpose.

The understanding is that the board will not take up specific industries first—such as steel—but will consider each state in turn, and later might turn to commodities.

"MOST FAVORED" TREATMENT TEST BY GERMANS OCT. 15

Collectors of customs throughout the United States are being notified by the commissioner that on and after Oct. 15 Germany will not be entitled to any of the provisions of the "most favored" nations treaties.

This is of special interest to the American steel trade. About 21 per cent of the steel imports into the United States during the first seven months of this year originated in Germany. This means that German imports after Oct. 15 will practically be penalized to amounts higher in some cases than 10 per cent.

During the first seven months, steel imports into the United States from Germany totaled 43,336 tons, compared with 18,769 tons last year. Some of the chief items of imports this year included shapes, 3039 tons; hoops and bands 2054 tons; ferromanganese and spiegeleisen 1209 tons; merchant and other bars, 1501 tons.

For the same period of last year, chief German steel imports included barbed wire, 5051 tons; nails, tacks, and staples, 4379 tons; hoops and bands, 1892 tons; structural shapes, 1303 tons; merchant and other steel bars, 866 tons.

During the same seven months of this year United States steel exports to Germany amounted to only 2770 tons, compared with 11,184 tons during the same seven months of last year.

TRADE TREATY WITH COLOMBIA IS NEARING APPROVAL

The steel industry should be more interested in the reciprocal agreement with Colombia than almost any other country, because that is the most important country in South America from the standpoint of steel exports from the United States.

Records at the department of commerce show that steel exports for January through July of this year to Colombia amounted to 17,960 tons, while for the corresponding period of last year they were 21,609 tons. We do not import any iron or steel products from there.

While the agreement has been signed by Secretary of State Hull and the Colombian Minister to the United States, it still has to be approved by the Colombian congress and ratified by the President of Colombia and by the President of the United States. It goes into force 30 days after final agreement has been signed.

Both countries engage to accord unrestricted "most favored" nation treatment in respect to customs.

Cold-Finished and Alloy Bar Center Near Detroit

AUTOMOBILES require such a large proportion of the total production of cold-finished and alloy steel bars that the geographical center of consumption of both products is within 50 miles of Detroit, the center of the automobile industry, the American Iron and Steel institute has calculated.

Consumption of cold-finished bars is centered around Toledo, O., and the center of consumption of alloy bars is located somewhat west of Toledo in the same county.

Center of production of cold-finished bars is near Akron, O., in Summit county, while the center of production of alloy steel bars is in Lucas county (Toledo) Ohio, which happens to be also the geographical center of consumption for that product.

HARDING DECRIES LAG IN TECHNIQUE IN HOME BUILDING

"In almost all other fields except house construction we have made huge strides in our ability to produce cheaply and well," said R. L. Harding, chief of the metals and minerals division of the department of commerce, last Thursday night talking over the radio under auspices of George Washington University on the subject of prefabricated houses.

Unfortunately, because of his official position at the department, Mr. Harding was not able to talk on the new steel fabricated houses because he cannot boost any material.

"The idea of prefabrication," he said, "is much older than you or I." He stated that during "these recent depression years, while the construction industry has been flat on its back, some of the builders and engineers and architects have not been idle." He went into all phases of the prefabricated situation.

Mr. Harding said that in his opinion "the real prefabricated house development, the one that may assume large proportions and exert great influence upon our economy and our living standards, is not here yet, but it is well along in its experimental and formative stage."

ROPER HOLDING TO COUNCIL

At a meeting to be held the latter part of October, a special committee will make a report on the possible reorganization of the Roper business advisory council.

This is the body from which prominent business men recently resigned in almost wholesale numbers because the President filed most of their reports in his waste basket.

Oct. 8 a dinner will be given in New York by this body, which will be purely in the nature of a social affair, and Secretary Roper will attend.

SENATE MUNITIONS COMMITTEE TO INVESTIGATE MANGANESE

Senator Murray, of Montana, has announced that an investigation of the manganese situation, with public hearings, will be held by the special senate committee on investigation of the munitions industry.

He stated that the investigation was requested by domestic manganese producers, and arrangements for the investigation were made during the closing days of congress by the special manganese committee of senate and house members. Senator Murray states:

"Manganese producers claim that the major steel companies have refused to buy domestic manganese ore, and during a period of years even paid an average of $4.10 per ton more for foreign than for domestic ores of similar grade. The purpose behind this, the producers claim, was to suppress production and bring about a removal of the duty.

"A monopoly on the manufacture of ferromanganese exists among major steel companies in the United States, the producers claim.

"In the negotiation of the Brazilian trade agreement, the state department gave no consideration to the need of manganese in our national defense, the producers claim. They charge that the state department did not consult the war department as to the need of manganese in national defense prior to the negotiation of the Brazilian trade agreement, wherein a cut of 50 per cent in the manganese duty is proposed.

"Statements made by the state department indicating the number of men employed and the available production are misleading and widely at variance with existing facts.

"Dr. C. K. Leith was a spokesman for the steel industry in opposition to the manganese ore duty, testifying before the senate finance committee in hearings on the tariff act of 1930. Dr. Leith is now serving as acting chairman of the mineral policy committee.

"Thus the steel industry has its spokesman in this key position with the Administration and the facts of the manganese industry are not being properly considered.

"Manganese is an essential war material necessary in our national defense. The full facts of the manganese industry should be brought to light under this investigation."

J. Carson Adkerson, president of the American Manganese Producers' association, charged Friday that Russia is attempting to undermine the national defense of the United States by causing domestic manganese mines to be abandoned.

Industrial Men in the Day's News

Robert T. Brooks, Executive Vice President, American Institute of Steel Construction

For the past 30 years he has been associated with the structural steel industry in New York.

He has been treasurer of the institute since 1931 and is now named to a newly-created position.

A number of institute committees have been under his direction at various times in past years.

ROBERT T. BROOKS has been appointed to the newly-created office of executive vice president of the American Institute of Steel Construction, 200 Madison avenue, New York, according to recent action of the institute's board of directors. The appointment will be confirmed at the thirteenth annual convention of the institute at White Sulphur Springs, W. Va., Oct. 16-18.

He has been identified with the structural steel industry in New York for the past 30 years. For a number of years he was vice president of John J. Radley & Co. Inc.

In 1914 he joined the firm of George A. Just & Co. as vice president, and in 1919 became its president. He has been treasurer of the Institute for the past four years.

During the time he was managing his own business, Mr. Brooks served the building industry of New York in many important capacities. He was a charter member of the Structural Steel Board of Trade of New York, vice president of the Iron League of New York, and chairman of the American Institute of Steel Construction committees on trade practices, cost accounting and others.

V. Gilmore Iden, for the past year acting secretary of the American Institute of Steel Construction, has been elected secretary. He joined the staff of the institute in 1927 to become director of public relations.

♦ ♦ ♦

Garrett A. Connors has resigned as director of purchases for Truscon Steel Co., Youngstown, O., to become assistant general manager of Youngstown Pressed Steel Co., Youngstown, O., a subsidiary of Sharon Steel Hoop Co.

♦ ♦ ♦

A. W. Burket has been appointed district manager in Chicago for the Griscom-Russell Co., New York, manufacturer of heat exchange equipment.

T. I. Phillips

Who as announced in STEEL for Sept 9 has been appointed general works manager of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., serving as central authority for all manufacturing operations of the company

Supervising sales activities in Chicago, St. Louis, Detroit, Milwaukee and adjacent territories, he will have headquarters at 20 North Wacker drive, Chicago.

♦ ♦ ♦

Dr. B. D. Saklatwalla, vice president and director of Vanadium Corp. of America, New York, has resigned to devote his efforts to the formation of

Dr. B. D. Saklatwalla

a new organization for research and development in new steels and alloys and for rendering service of an advisory nature in metallurgical and allied chemical fields. Special feature of the contemplated organization which he will head will be its international scope.

Dr. Saklatwalla is an acknowledged international authority on metallurgical subjects and has had a career of 26 years in the ferroalloy and alloy steel industries. He has to his credit inventions of various products and processes, has been honored by the British Iron and Steel institute, and has received the Grasselli medal of the Society of Chemical Industry.

♦ ♦ ♦

Willard F. Stahl is manager of the new branch which Otis Steel Co., Cleveland, has opened in the Liberty Bank building, Buffalo.

♦ ♦ ♦

M. J. Van Leeuwen has joined the sales department of the Geo. C. Isbester Co., 713 Railway Exchange building, Chicago, representative of Yale & Towne Mfg. Co., Philadelphia, and will be engaged in the sale of the latter's electric trucks, tractors

and other products in the Chicago district. For the past seven years he has represented the Rowan Controller Co., Baltimore, and the Nichols-Lintern Co., Cleveland, in Chicago. Prior to this he was employed as a sales engineer in the New York office of the Condit Electrical Mfg. Co., South Boston, Mass.

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Ford Schusler has been named manager of the industrial sales division of Keystone Steel & Wire Co., Peoria, Ill.

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Dr. Thomas S. Baker, since 1922 president of Carnegie Institute of Technology, Pittsburgh, and known throughout industry for his interest in the institute's metallurgical advisory board, has resigned.

• • •

Frank Liebich has been named district manager in the Detroit area for Harnischfeger Corp., Milwaukee, transferring from the company's Chicago office. He entered the sales division of Harnischfeger in 1924.

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D. L. Cable has been appointed sales manager of the Ferro Enamel Co., Cleveland, in connection with recent personnel realignments. J. E. Hansen is the new director of service. L. B. Hart is director of field service.

• • •

Charles S. Carmdoy, formerly with Frederick, Traugott, Allen & Co., has become associated with Walter S. Aylsworth, Pittsburgh representative of Charles Taylor Sons Co., Cincinnati, refractories interest.

• • •

A. E. Heroux has been appointed general manager of the Permite paint sales division of Aluminum Industries Inc., Cincinnati, succeeding A. B. Anderson, resigned. Mr. Heroux has been with the company three years as Detroit district manager of the paint division.

• • •

R. P. Kilsby, formerly attached to the general sales office of Babcock & Wilcox Tube Co. at Beaver Falls, Pa., has been appointed manager of the company's western sales territory. He will have jurisdiction over all the districts covered by the company's offices west of the Mississippi river and will make his headquarters in the Marquette building, Chicago.

• • •

J. P. Distler has been appointed manager of sales, wire division, Republic Steel Corp., with headquarters at the Grand Crossing plant in Chicago. He succeeds R. W. Hull, whose duties as assistant manager of sales for all Republic products in the Chicago district will now receive his entire time. Prior to his appointment with Republic, Mr. Distler

J. P. Distler

had been connected with Keystone Steel & Wire Co., Peoria, Ill., continuously since 1918. For the past five years he was general manager of sales for Keystone, following ten years of experience as assistant sales manager.

• • •

Paul Weeks, for the past four years manager of the Washington office of Caterpillar Tractor Co., Peoria, Ill., has been appointed manager of the special sales division, succeeding Walter H. Gardner who as noted in STEEL for Sept. 16 has resigned to become general sales manager of Keystone Steel & Wire Co.

C. L. McCulen and G. E. Spain will assist Mr. Weeks in the special sales division.

• • •

Ralph O. Griffis has been appointed sheet metallurgist for the Youngstown Sheet & Tube Co., Youngstown, O. He was formerly associate director of research for the American Rolling Mill Co., Middletown, O. Mr. Griffis has spent more than 21 years in the specialty steel sheet industry, having devoted most of his time to deep drawing, enameling and aging problems. In 1934 he and two coworkers were awarded the Gary medal by the American Iron and Steel institute for a paper on aging of mild steel sheets. He is located at the Campbell works, where Sheet & Tube has recently put into operation its new hot and cold continuous mills.

• • •

Henry Butler Allen, metallurgist, Henry Disston Co., Philadelphia, has been elected director of the museum of Franklin institute, Philadelphia, effective Oct. 1. He has been a member of the board of managers of the institute for several years, and chairman of the museum committee for the past two years. At one time United States examiner for iron and steel at the port of New York, he has been with the Disston organization since 1913.

Dr. Howard McClenahan, who has been granted a year's leave of absence because of ill health, will continue as secretary of Franklin institute, a position he has held since 1925.

Died:

WILLIAM H. HUNTER, 48, machinery division manager at Chicago for the Pratt & Whitney Co., Hartford, Conn., in Cleveland where he was attending the Machine Tool congress and show, Sept. 11. He had been with Pratt & Whitney continuously for 32 years in various sales capacities. He began as a clerk in the Philadelphia sales office and eventually became manager in 1928. In 1930 he was transferred to Chicago.

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Alfred R. Hughes, president of the Warren City Tank & Boiler Co., Warren, O., in that city, Sept. 17.

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Maurice I. Johnson, treasurer, Gisholt Machine Co., Madison, Wis., in that city recently. He was actively interested in the foundry department of Gisholt for 30 years.

• • •

Charles A. Williams, 58, lake traffic manager for Interstate Steamship Co., subsidiary of Jones & Laughlin Steel Corp., and for 40 years active in traffic business on the Great Lakes, in Cleveland, Sept. 18.

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Edwin D. Lines, 65, former president of the Central Metal Products Corp., Canton, O., and also former general sales manager of the Dahlstrom Metallic Door Co., Jamestown, N. Y., in Jamestown, Sept. 12.

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Fritz Holving, prominent mechanical engineer formerly identified with Standard Seamless Tube Co., Ambridge, Pa., Pittsburgh Iron & Steel Foundry Co., Midland, Pa., and Midland Steel Co., Midland, Pa., in Sewickley Pa., Sept. 6.

• • •

Earl P. Sedgwick, 68, president of the Chicago Hardware Foundry Co., Chicago, in Waukegan, Ill., Sept. 13. On June 1 he celebrated his fiftieth year of service with the company and its predecessor, the Chicago Hardware Mfg. Co. He helped to organize the Chicago Hardware Co. as a subsidiary of the Chicago Hardware Mfg. Co. He became secretary and treasurer of the new company, and in 1921 was elected president.

EDITORIAL

Keep Posted, If You Would Meet Today's Competition

A FEW weeks ago a manufacturer of industrial equipment, writing in STEEL's "Forum on Modernization," suggested a simple test for emphasizing the degree to which obsolescence may creep upon a product in a short period of time. He said:

> "Suppose we were about to buy a new automobile or an electric refrigerator and we called on a dealer who showed us a machine ten years old that had never been used, that had been sealed up in a glass case for the past ten years, that was the recognized leader in its line, the finest thing produced, measured by all standards of ten years ago. Now just what would any of us pay for such a machine? We wouldn't pay anything for it. We simply wouldn't have it It is obsolete as measured by today's standards."

Everyone recognizes the truth of these words. The best 10-year old model of an automobile, refrigerator, airplane, radio, washing machine, etc. would be unacceptable today because it is outmoded in appearance, performance, economy of operation, reliability and in numerous other respects. In brief, the buyer can get so much more value per dollar in today's products that he could not afford to go back to the standards of 10 years ago.

How Industry Is Contributing To Advances in Standard of Living in Machine Civilization

However, the benefits of greater value at lower price have not been confined to the buying public. The more the skill and ingenuity of industry has lowered costs and broadened the market, the more employment has been stimulated and the greater has been industry's ability to maintain high wages and salaries. Ralph E. Flanders, president of the American Society of Mechanical Engineers, appraised these benefits aptly when, in a recent address, he said, "In the combination of more and better goods at lower prices and of more employment at higher wages and salaries, we have the complete ingredients of that higher, general standard of living which has been and must continue to be the useful social consummation of our machine civilization."

Industry today is dramatizing its contributions to these higher standards more effectively than at any time in many years. The Third Machine Tool show, which closed Saturday in Cleveland, demonstrated in a striking manner what improved machined tools and accessories mean to the economic and social development of the nation. In the next few weeks, a number of conventions and exhibitions will focus attention upon other ways in which industry is contributing to this progress.

Outstanding among industry's achievements in this respect are its recent improvement of iron, steel and nonferrous metals and alloys and the attending advance in the methods by which these materials are produced, treated, fabricated and applied to the exacting requirements of the present machine age. Few persons, even in industry, appreciate fully the significance of the modern miracle which permits the manufacturer of, say, an automobile or electric refrigerator to incorporate in his product intricate parts of such uniformity in quality that difficult forming, heat treating, fabricating and finishing operations can be performed with dispatch and precision upon a mass production basis.

Good Way To Keep Abreast of Developments Is To Attend Fall Conventions and Shows

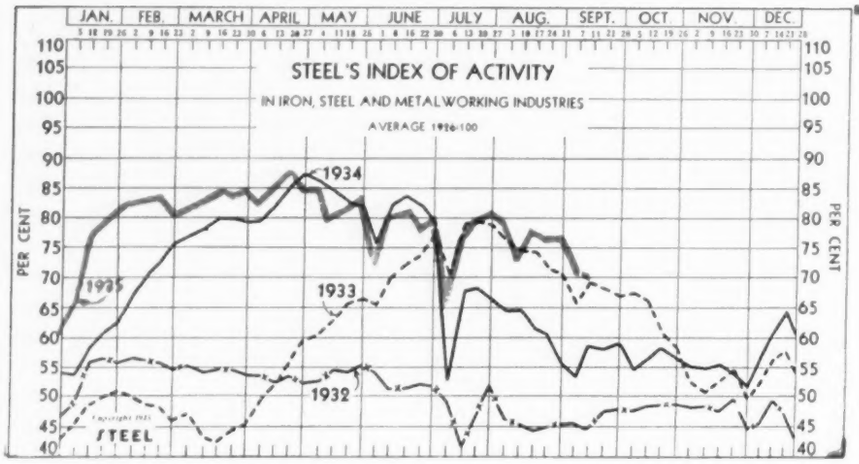
That such a feat is possible is a fine tribute to the personnel of the metal industries. It means that the talents of metallurgists, engineers, production men, equipment manufacturers and others have been combined not only to make available a greater variety of ferrous and nonferrous materials than ever has been offered before but also to devise the methods and equipment required to permit industry to employ these materials to the best advantage.

Remarkable advances in this respect have been made in the past year. Many new materials have been introduced. Heat treatment processes and equipment have been improved. Welding, finishing and many other important operations which facilitate the proper application and use of materials have undergone marked changes. All along the line advances have taken place which make it desirable for users of metals to check up on today's practice.

This can be done best by attending the appropriate conventions and expositions. For the latest developments in methods and materials, go to the National Metal congress and exposition in Chicago, Sept. 30-Oct. 4. For late improvements in steel industry engineering attend the convention and show of the Association of Iron and Steel Electrical Engineers in Pittsburgh, Sept. 24-26.

You will penalize yourself and your company if you fail to keep abreast of progress in this period of unusual development.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 0.9 points to 70.0 in the week ending September 14:*

Week ending	1935	1934	1933	1932
July 13	76.5	67.8	79.1	46.7
July 20	79.8	68.1	79.4	51.5
July 27	80.8	66.4	78.8	46.1
Aug. 3	78.4	64.6	75.9	45.1
Aug. 10	73.4	64.6	74.7	44.6
Aug. 17	77.5	61.4	74.2	44.9
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31	77.3	55.1	70.3	45.4
Sept. 7	70.9†	53.5	65.5	44.9
Sept. 14	70.0*	58.7	69.1	47.8

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Business Improving Steadily, But Gains Are Uneven

IMPROVEMENT in industrial activity continues steadily. In almost every line the rebound from Labor day week has been gratifying. In the one notable exception — automobile assemblies — the explanation lies in the fact that the changeover to new models now is in progress. The pace in motordom will increase rapidly in the next few weeks.

The generally brisk aspect of industrial activity today obscures the really wide disparity in the levels of certain key barometers. For instance, the index of machine tool orders for August (three-months' moving average) stands at 112.2 on the basis that the average monthly shipments for 1926 equals 100. This is the best showing since the month of December, 1929.

Electric power output, at 1,827,500,000 kilowatt hours for the week ending Sept. 14, is running at about 150 per cent of the average for 1926.

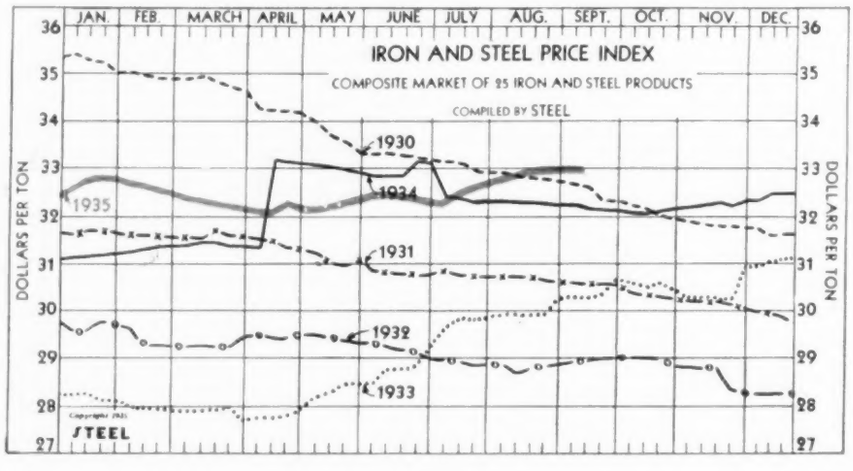
In contrast to these favorable comparisons, consider revenue freight car loadings. Loadings for the final week of August were 679,900, the highest for the year to that date. In the week ending Sept. 14 loadings probably will be near 700,000, which will establish a new high for 1935. Yet this figure is only 68 per cent of the average for 1926.

Again, steelworks operations at 54 per cent of capacity seem gratifying in light of the experience of recent years. However, that rate is only 58 per cent of the average for 1926.

A weekly assembly of 82,700 automobiles is necessary to match the average for 1926. Assemblies in the week ending Sept. 14 were only 16 per cent of that average.

The improvement in industrial activity is strong, but it still is decidedly spotty.

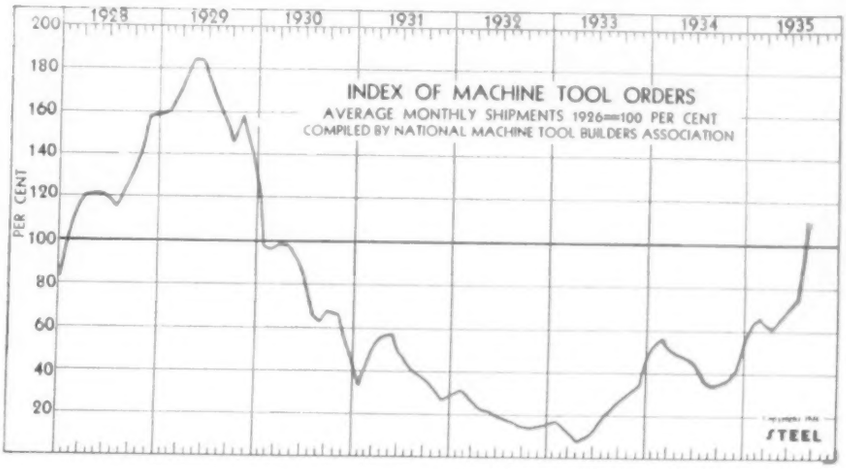
1935	
Sept. 14	$32.81
Sept. 7	32.79
Aug. 31	32.78
Aug. 24	32.72
Aug. 17	32.68
Aug. 10	32.64
Aug. 3	32.59
July 27	32.55
July 20	32.42
July 13	32.40
July 6	32.39



1934	
Sept. 15	$32.14
Sept. 8	32.17
Sept. 1	32.17
Aug. 25	32.22
Aug. 18	32.23
Aug. 11	32.23
Aug. 4	32.28
July 28	32.28
July 21	32.28
July 14	32.33
July 7	32.38

Machine Tool Orders Continue Upward Swing

	1935	1934	1933	1932
Jan.	61.3	56.5	18.3	32.8
Feb.	61.5	58.2	15.2	30.4
March	60.3	50.9	11.1	23.9
April	60.3	48.5	8.3	20.6
May	67.1	46.8	10.6	20.8
June	76.7	42.6	15.5	21.7
July	94.7	38.6	22.4	18.7
Aug.	112.2	37.1	27.9	16.8
Sept.	.....	37.4	30.9	15.3
Oct.	.....	40.5	33.3	15.7
Nov.	.....	44.2	38.0	16.4
Dec.	.....	54.1	51.0	17.6

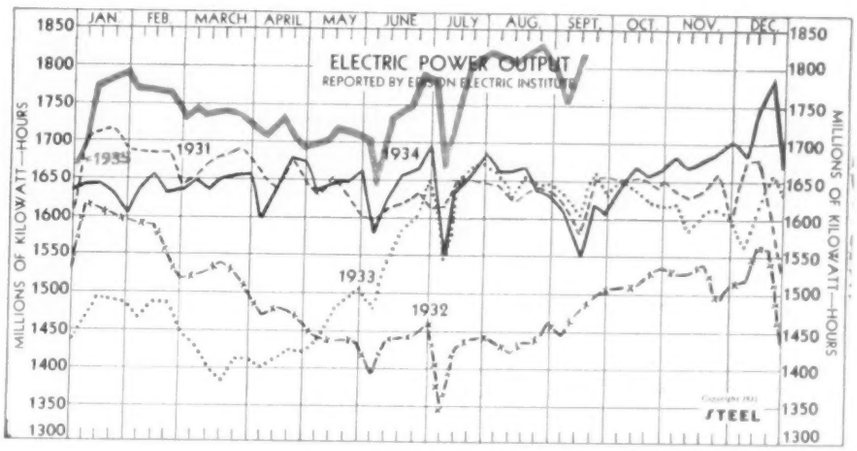


Electric Power Output Shows Sharp Recovery

Million Kw.-Hr.

1935

Sept. 14	1,827
Sept. 7	1,752
Aug. 31	1,809
Aug. 24	1,839
Aug. 17	1,832
Aug. 10	1,819
Aug. 3	1,821
July 27	1,823
July 20	1,807
July 13	1,766
July 6	1,655
June 29	1,772

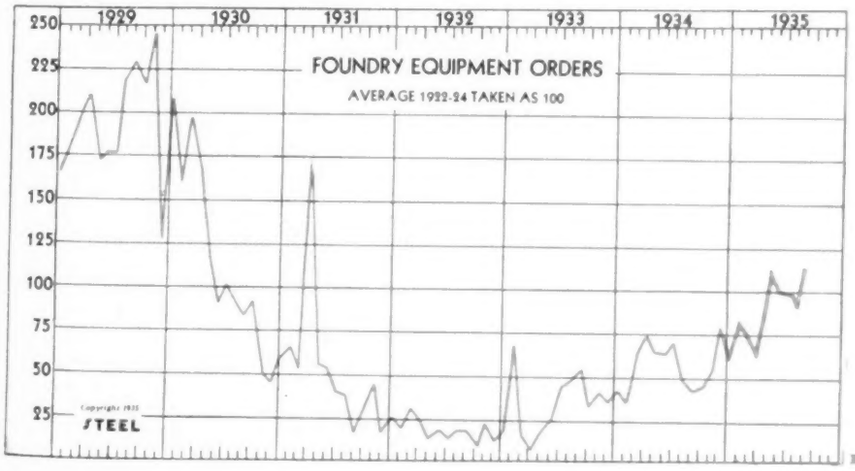


Million Kw.-Hr.

1934

Sept. 15	1,633
Sept. 8	1,564
Sept. 1	1,626
Aug. 25	1,648
Aug. 18	1,674
Aug. 11	1,659
Aug. 4	1,657
July 28	1,683
July 21	1,663
July 14	1,647
July 7	1,556
June 30	1,688

August Foundry Equipment Orders Up Sharply



	Per Cent		
	1935	1934	1933
Jan.	86.6	37.2	68.4
Feb.	75.7	65.8	16.1
March	69.3	75.4	9.8
April	113.2	67.9	19.4
May	100.7	66.5	25.6
June	100.2	70.4	45.5
July	94.0	50.7	48.8
Aug.	113.0	43.1	56.3
Sept.	.....	46.4	34.9
Oct.	.....	55.3	42.5
Nov.	.....	80.4	36.6
Dec.	.....	66.9	43.8

A corner of the Michigan Tool Co. plant, showing several types and sizes of Cone area contact worm gears in production

Area Contact Worm Gearing—What It Is and How It is Manufactured

INTEREST in worm gearing for all types of industrial and production applications is receiving an important stimulus at present as the result of the perfection of manufacturing methods by the Michigan Tool Co., Detroit, for the production of Cone area contact worm gears (named after their inventor, Samuel I. Cone).

The desire for gears having teeth in surface rather than in line contact has long existed, but no known manufacturing method previously would produce such gears with their low unit pressures, high efficiency, extreme load carrying capacity, high thermal rating, resistance to wear and silence in operation.

The solution of this vexing engineering problem thus goes to the credit of a machine tool manufacturer. The success of the Cone worm gearing may be said to be a direct result of the discovery of a rational method of and the development of means for generating a worm and worm wheel in which the entire tooth depth of the worm thread and wheel tooth flanks are in contact, while the worm is threading itself through the wheel teeth, or vice versa.

Perhaps, for the purpose of properly estimating the significance of this development, a brief review of the manufacturing and operating characteristics of worm gearing may be desirable.

The normal method of manufacturing conventional worm gearing as far as tooth form is concerned, is to give the teeth on the wheel an involute form while worm threads in cross-section have straight line flanks. Theoretically a tooth on the worm wheel will first contact the worm thread at a point close to its root. As the worm threads its way through, across the face of the wheel tooth, the point of contact gradually moves toward the tip, the tip of the worm wheel tooth being the last point in contact with the worm thread, just before the two separate.

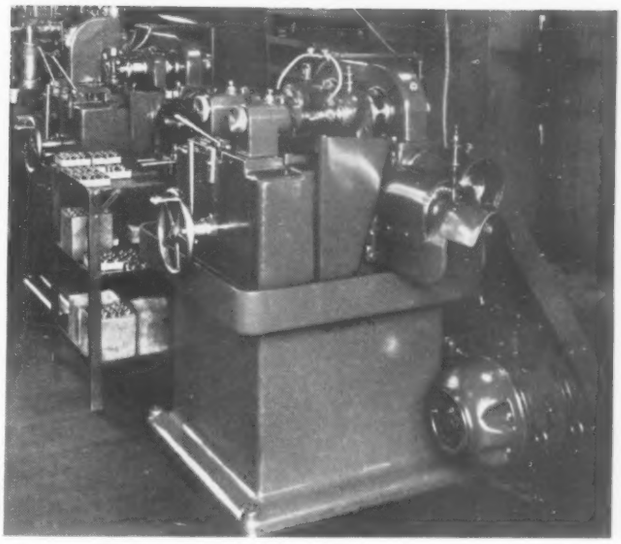
Thus, in addition to the sliding action of the worm thread across the face of the tooth, there is also a slipping action—sometimes referred to as rolling action—along the tooth flank, from root to tip.

Due to the thickness of the worm wheel there is of course more than a point contact—the contact really being a short line extending slightly either side of the midplane of the worm wheel. While in theory several worm wheel teeth could be in contact with the worm thread at any given instance, this is not obtainable in actual practice, there being only one tooth normally in contact, except for the rather doubtful value of root and tip contact on succeeding teeth.

Obviously, line contact such as is machined into conventional worm

gearing could transmit no lead, since unit pressures would be infinite. Actually what happens is that the teeth and thread deflect somewhat, under these loads, spreading the line out into a small area.

Since this deflection takes place every time a tooth comes into engagement, wear will be concentrated at that area, eventually wearing grooves or "holes" in the worm. In an effort to reduce this wear to some extent, worms are generally made of low-carbon steel, heat treated and case hardened after finishing. As is well-known, such heat treatment inevitably distorts the worm, making it difficult to produce accurate worm gearing by requiring extensive and costly subsequent grinding and lapping. The wheels, on the other hand, are made of a soft metal in an effort to transfer the wear to the more numerous teeth on the wheel.



A pair of special machines for the production of worm gears for superchargers. These units have two hobs per work piece, cutting production time in half

Finding Production Method

The previously mentioned slipping or rolling action between the teeth and thread has another characteristic, that of squeezing or scraping the oil out of the grooves. It is this that is responsible for the difficulties of lubricating worm gearing, often requiring special high-viscosity lubricants.

Other manufacturing methods, such as giving the worm thread an involute form, with straight flanks for the wheel teeth, improve the wear of the worm somewhat by transferring it to the wheel, but in general do not change the operating characteristics of the gearing.

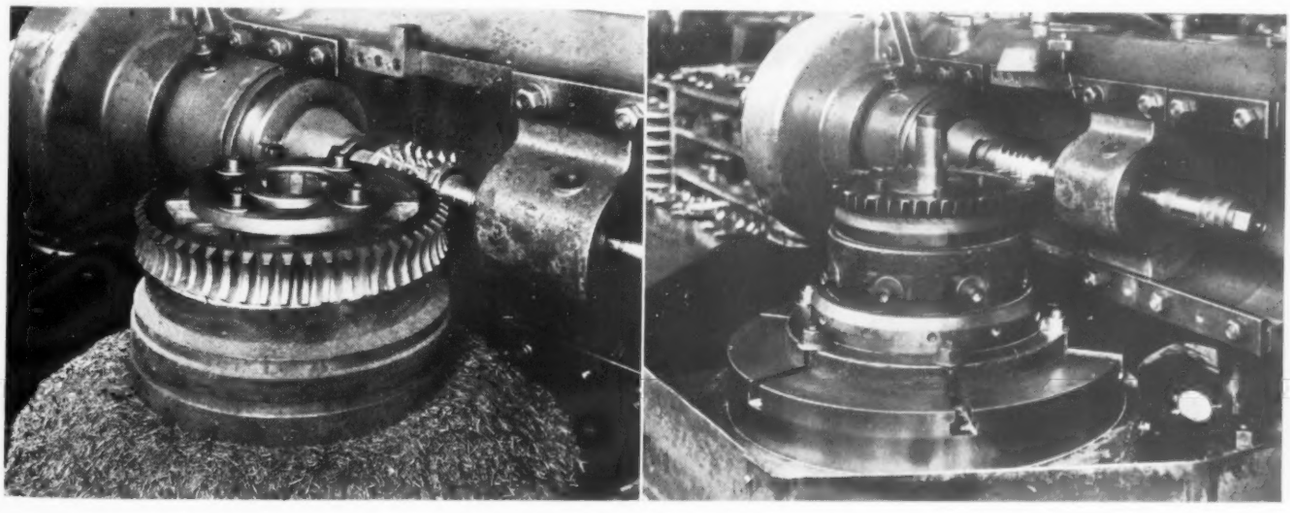
So much for conventional worm gearing. Some years ago the idea of giving the worm an "hourglass" shape became recognized as a possible solution to some of the problems, particularly that of lubrication. If the threads of the worm from one end to the other followed the same curvature as the worm wheel, obviously there should be no rolling action between the teeth. Furthermore, *on paper* such hourglass worms could be laid out with teeth having straight-line flanks in cross-section both on the worm and on the wheel. This, engineers recognized, would result in wheel teeth and worm threads in contact the whole depth of the teeth, and since the worm wheel had a definite thickness, there would be substantial surface contact.

This looked like such an obvious solution to all the problems of worm gearing that numerous patents at that time were actually applied for on such designs. Unfortunately, however, when the problem of making such gears was turned over to the production man, it was found impossible to make them.

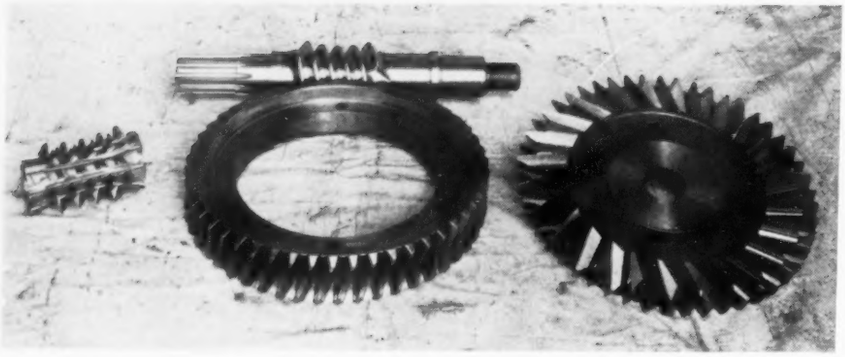
Obviously, the worm and wheel both had to be generated by hobs or cutters which simulated the mating gear. But no matter which way such cutters were fed into the blanks, whether tangentially in the direction of or at right angles to the hob axis, or by feeding the centers toward each other, the tooth form which looked so good on paper could not be obtained. The trouble was that while the cutter was being fed into the work, it was cutting away, by interference, material which was really part of the desired final tooth form. The only place at which the form was correct was at the center plane of the worm wheel. Instead of having complete surface contact there was again line contact, only this time the line was at the center plane, down the flank of the teeth rather than across the face.

Only recently, as a matter of fact, one of the world's best known worm gear manufacturers, in a treatise of automobile worm gearing, showed a theoretical diagram of such a gear, stating "Its superficial attractiveness cannot be realized in practice."

The solution of the problem by Mr. Cone, and the development of production methods and equipment to



The same machine, if desired, can be used to produce interchangeably both worm and worm wheel. At the left the worm wheel teeth are being hobbed; at the right the worm thread is being hobbed



A sample Cone worm gear set, together with the hobs used to produce these gears

make the gears in any sizes, ratios, or quantities by Michigan Tool Co., was based on the recognition that no cutting of the final tooth form must take place *except with the hob and work piece on the same centers as those of the worm and wheel when assembled in service operation.*

For cutting the teeth on Cone worm wheels, hobs are used which are identical in form with the mating worm, except that the thread, or teeth, are thinner in cross-section. The hob first cuts grooves in the wheel blank by feeding the centers of the work-piece and cutter toward each other. This might be considered a roughing operation. The groove thus cut is materially narrower than required when the wheel teeth are finished but, on the other hand and for the same reason, no material has been cut away from the blank that should be left on for an eventual correct tooth form.

In other words the cutting away of stock due to interference has been confined to that part of the stock which eventually would have to be removed anyway. The objective of this portion of the operation of course is to bring the cutter and work piece into proper axial relation.

Two Hobs Per Workpiece

Having reached the correct depth of cut, the feed now becomes rotary. Either the hob or the work piece is rotated slightly about its own axis (it being immaterial which), while both hob and work piece are rotating on the machine. The feed thus is similar to the way in which the gear would take up its own backlash, if clearance space existed.

Stock removal to obtain correct tooth form is thus obtained by shaving the material in layers off the tooth or thread flanks until the final tooth form and dimensions are reached.

On machines equipped with single hobs, the hob is fed angularly, or rotated in one direction to face one tooth flank, and the feed is reversed to finish the flank on the other side of the groove.

The reason why both correct tooth form for surface contact and correct tooth dimensions can be obtained simultaneously is to be found in the tooth form. In Cone gearing the flanks of both the thread on the worm and the teeth on the wheel show up as straight lines when a plane is passed through the axis of the worm. All these lines moreover are tangent to a circle about the axis of the worm wheel, the diameter of the circle depending on the desired pressure angle, etc. On the hobs, while the cutting teeth are thinner, they also have straight-line flanks in section, and these are made tangent to a circle of exactly same diameter.

Thus it is seen that the correct tooth form will be generated automatically irrespective of the thickness of the teeth on the hob or the amount of stock being removed in finishing. Furthermore, the hob can be re-ground time and again without influencing its effectiveness, as long as the flanks are always ground tangent to the same base circle.

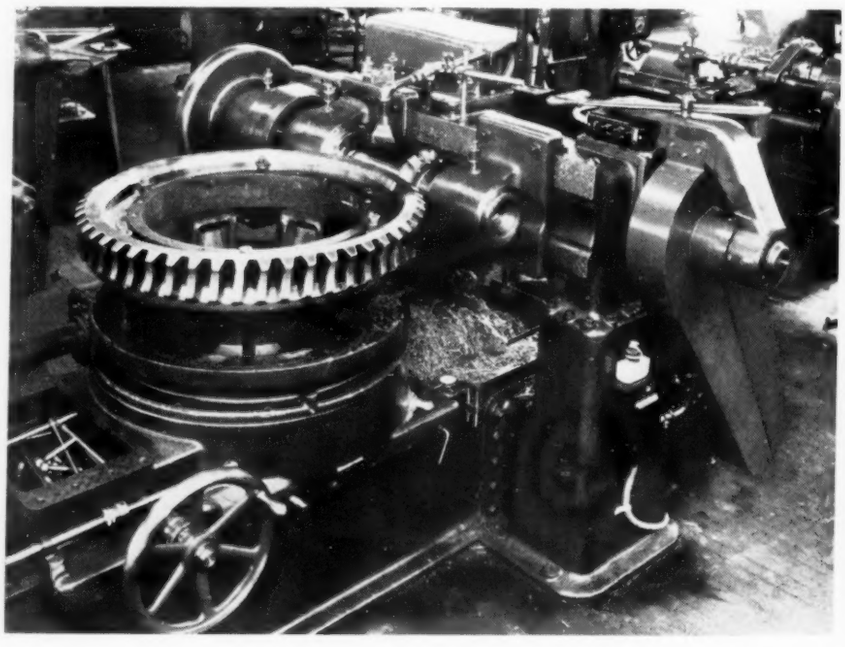
For large-scale production, machinery has been developed employing two hobs per work piece. These are fed into the work piece simultaneously until correct center distances are reached, one on either side of the blank. Then one is rotated in one direction to cut the tooth form on the "front" of the teeth, while the other is rotated in the opposite direction to form the flanks on the "back" of the tooth. Production rates as high as 270 sets of gears per hour per operator have been reached with such equipment. For small production of highly specialized gearing, methods have also been developed whereby a fly tool can be used to produce the gearing, thereby reducing tool cost.

The natural wearing-in of the gears in service will remove automatically such minor inaccuracies as may occur in routine production. Where maximum initial quietness is essential, these small inequalities may be removed before assembly with special lappers designed for the purpose. However, grinding is not required in any case.

Gears Improve in Service

Since both worm and wheel are generated by hobs and generating cutters of identical mating capacity, any wear that occurs will tend to improve the gears in service, thereby differing sharply from the previously explained wearing characteristics of conventional worm gearing. It thus can be said that Cone worm gears wear "in" where in other types of gearing they wear "out."

The true surface contact obtained with this process, giving an average approximately 30 times the contact



For small-scale production of large gears, hob cost can be reduced by using cutters having only one wrap, instead of making a complete hob, as shown here. End mills also can be used

of conventional worm gearing, it is stated, makes any heat treatment of worm or wheel unnecessary, and high-carbon steel can be used if desired. For some applications cast iron and steel have been found a satisfactory combination, the cast iron replacing bronze.

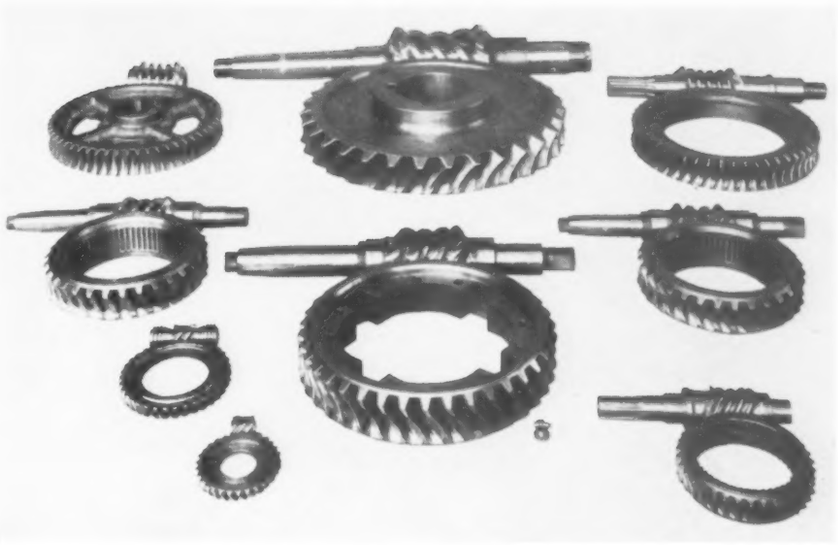
It might be noted further that since the hobbing methods for worm and wheel are identical, the same machine or machines can be used for hobbing both worm and wheel. After the worm is generated, it can be removed, and replaced by a hob to form the teeth on the wheel blank, the latter having been mounted on the machine in place of the cutter which hobbed the worm.

Self-Oiling Characteristics

An important factor contributing to the success of the Cone worm gears in service is probably in the self-oiling characteristics of these gears. The worm thread when engaging the wheel, enters it in the form of a wedge, forcing in oil which is then carried through the wheel by the sliding action across the face of the teeth. As a matter of fact, the teeth to a large extent apparently ride on a cushioning film of oil, which also may account in part for the efficiencies of 99.34 per cent encountered with Cone gearing in independent laboratory investigations. As a result of these characteristics, the gears can be operated on ordinary lubricants.

In addition to the surface contact obtained with this manufacturing process, it is evident that there are as many teeth in contact as the design envelops. Thus the load is distributed over a greater number of teeth, resulting in quieter and smoother operation. Less bending of the worm shaft is also an obvious corrollary of better load distribution.

Cone worm gearing is being used already in a wide variety of applications, with service speeds ranging from 30,000 revolutions per minute in one case to one revolution every quarter hour in another. Ratios of gears in use range from 100 to 1 on gears 6 feet in diameter, to a 1 to 1 ratio for gears of 1-inch diameter.



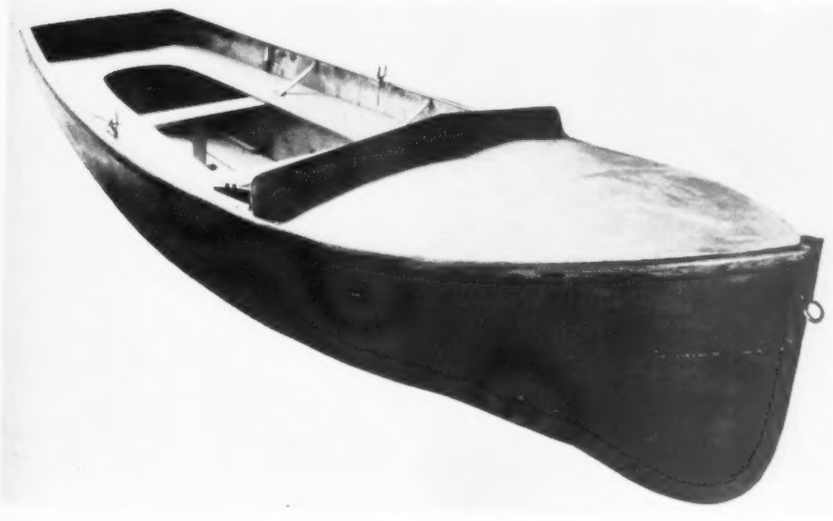
A group of area contact worm gears for different applications. At right, top to bottom, the gears are for a tractor, a bus and an experimental passenger car. The center group from the top includes gears for a steel mill charger, another bus rear axle and a ventilator regulator. At the left, from the top, are gears for a road grader, a motor truck and two different sizes of superchargers

Stainless Boat for Glacier Priest

AFTER previous experiences with other types of boats in swift and rocky rivers of Alaska, Father Bernard Hubbard, S. J., widely known Glacier priest, has provided himself with an open boat fabricated entirely of stainless steel.

Built by the Welin Davit & Boat Co., Newark, N. J., of stainless steel supplied by Allegheny Steel Co., Brackenridge, Pa., the boat is entirely of welded construction, using the electric arc process and coated rods of the same analysis as the metal. The keel is a single ½ x 2½-inch bar placed edgewise. The skin of the boat is of 14-gage and the air tanks and bulkhead of 22-gage sheets. The steel, of the 18-8, chromium-nickel type, contains 0.08 per cent maximum carbon and has a No. 2B finish.

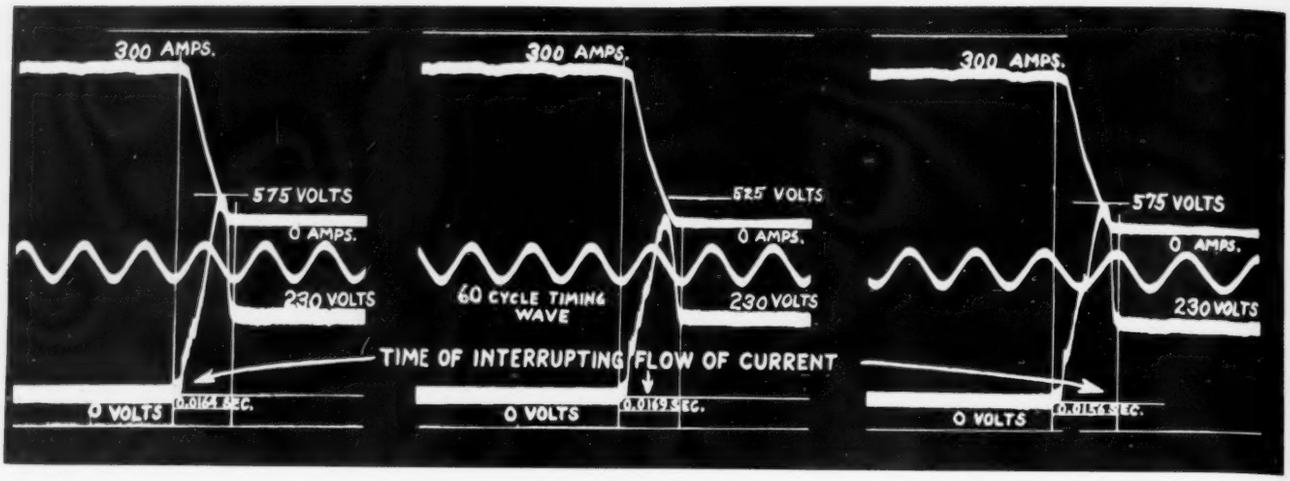
Intercostal members are of angles of similar composition. Thwarts and gunwales are of wood and a wooden floor rests on the intercostals. A 5-foot forward deck has an 8-inch sprayboard and a vertical bulkhead at its after edge, providing a waterproof storage. There is a watertight door in the bulkhead which, together with the deck and sprayboard, is of stainless steel. The air chambers are placed in the stern. The boat is 18 feet long with beam of 5 feet 10 inches and measured depth of 2 feet 5 inches. It weighs about 1800 pounds. It is propelled by a 32-horsepower, outboard motor mounted on the transom stern.



Stainless steel was selected for this new boat for Father Hubbard, the Glacier priest, for use on the swift and rocky rivers of Alaska

Cream Protects Skin

A new cream to protect workmen against dermatitis from contact with paints, acids, caustics, oils, and other skin irritants, has been developed by E. D. Bullard Co., 275 Eighth street, San Francisco. It is rubbed into the exposed skin before the workman goes on the job and forms an invisible, dry protective film. At the end of the working period, the film is removed with ordinary soap and water.



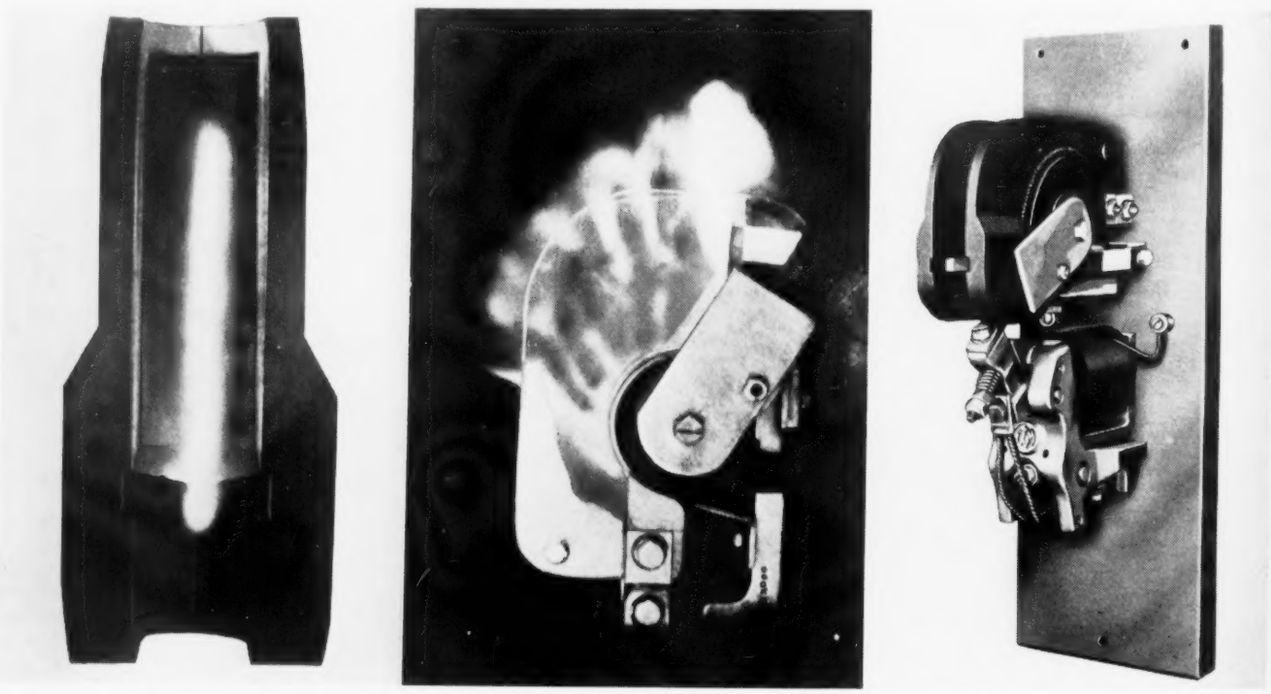
Oscillograph curves of the new contactor rupturing a 300-ampere circuit. Current curve is a smooth, straight line from maximum to zero value. There is no restriking of the arc and but one smooth, rounded voltage peak across the contacts as the circuit is opened. Time of rupturing is consistent and of short duration

ARC IS DISCHARGED IN LINE FORM IN CONTACTOR OF NEW DESIGN

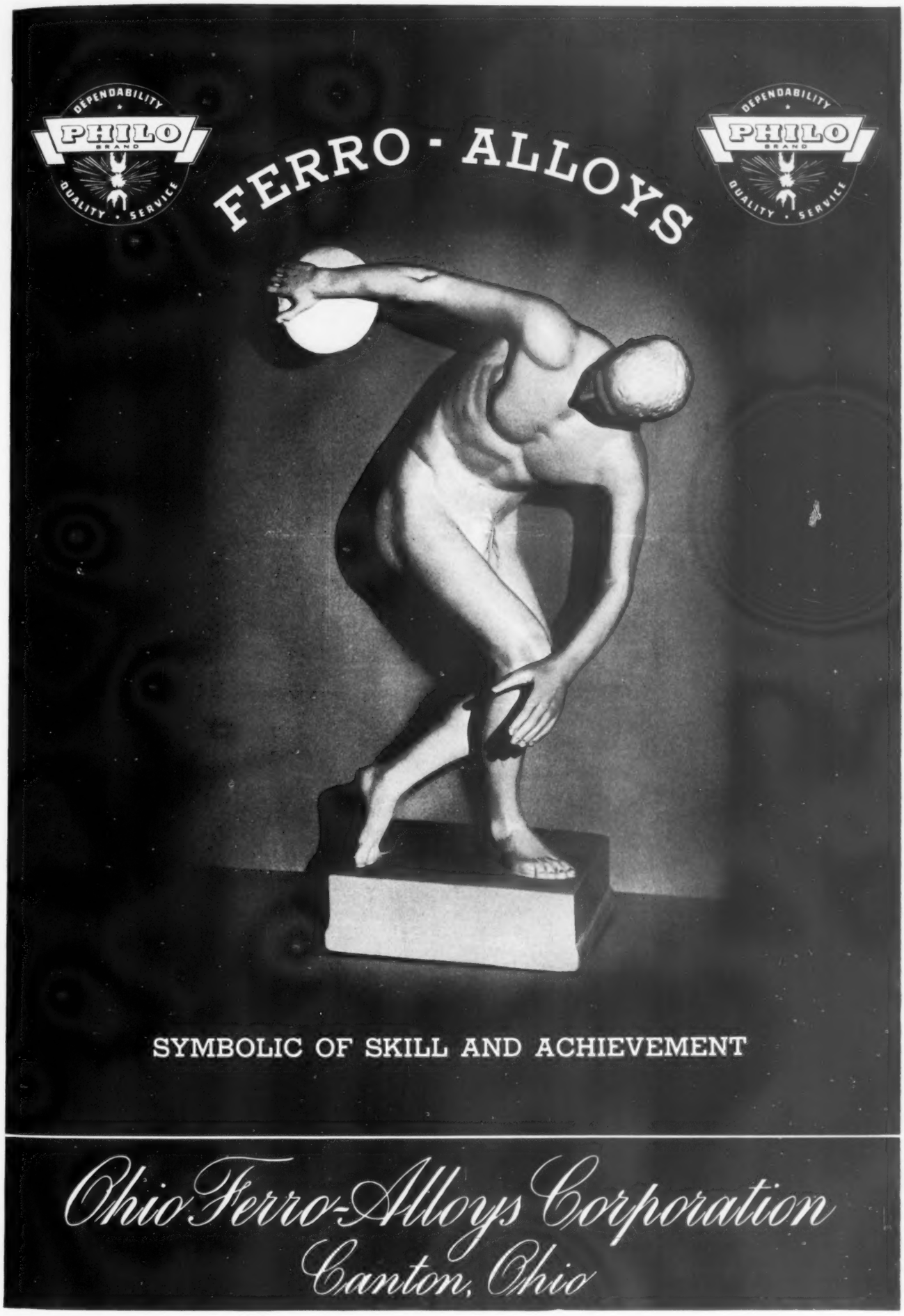
A LINE of alternating and direct current contactors of entirely new design and employing a new arc-handling principle is announced by Electric Controller & Mfg. Co., Cleveland. The result of more than four years of laboratory work, it embodies a spectacular new method of handling the arc so that it discharges in the form of a narrow line. From this characteristic is derived its name, Line-Arc.

As the contacts of these new contactors start to separate, the arc immediately is removed from the contact tips. One end travels rapidly up along the circular copper guard over the blow-out coil and the other end travels outward and in the opposite direction along the horizontal copper arcing plate located between the arc shields. Thus the arc is not allowed to play around on local areas but is kept moving at high speed, being stretched out in a line midway between the arc shields until it is ruptured.

When temperature of arc handling surfaces is raised by the heat of the arc to the point where electrons are



By the new principle, as shown at left, the arc is guided in a narrow path or line centered between but not touching the arc shields. Side view of the arc is shown in center through glass arc shields which were not smudged or harmed during the test. At right is shown the new contactor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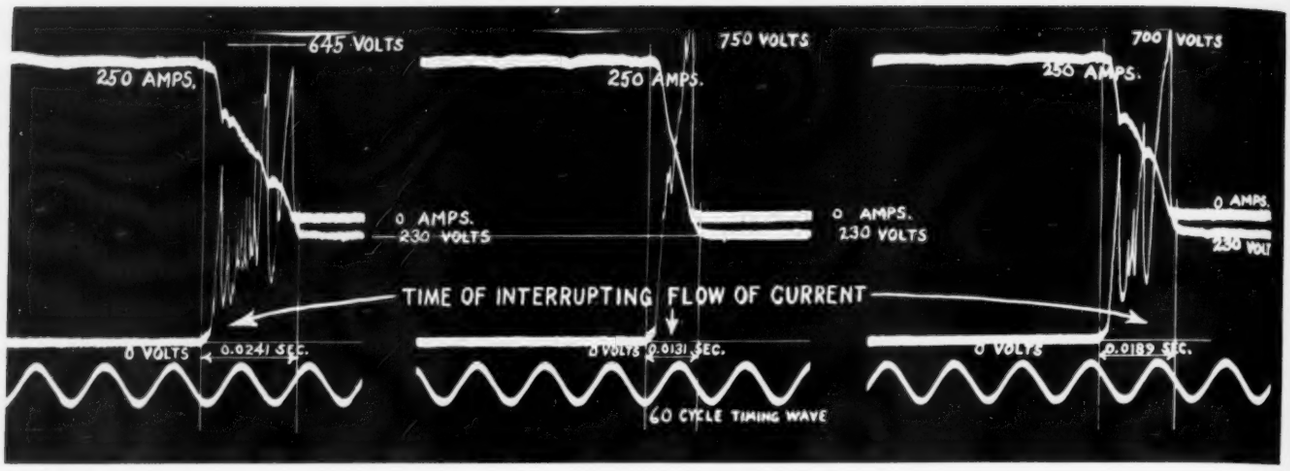
Ohio Ferro-Alloys Corporation
Canton, Ohio



Oscillograph curve of previous design contactor interrupting current of 250 amperes. The ripping or tearing sound heard as the circuit is ruptured is suggested by the uneven, non-uniform current curve shown. Voltage bumps and variable and inconsistent duration of circuit-rupturing time such as shown above are eliminated with new contactor

fed into the arc stream, as is well known, the path of the arc becomes a better conductor and more difficult to rupture. Of importance, therefore, is the fact that instantaneous removal of the arc from the contact tips of the new contactors allows the contacts to remain cool. Under normal conditions they never even reach the temperature of electronic transmission. There is no consumption of metal from the arcing plate and blow-out guard, and life of these parts, as a result, is said to have been increased far beyond anything possible with previous contactors.

Arc Breaks Clean

The new design causes the arc to break clean. By moving the arc at high speed and eliminating the emission of electrons into the arc stream, there is no re-striking of the arc with its succession of rapidly occurring sharp voltage peaks to strain the insulation of connected apparatus. Instead, there is only one moderate and rounded voltage peak across the contacts as the arc is ruptured. This characteristic is illustrated in the accompanying oscillograph curves. They also show that the current curve of the new contactor is a straight line from maximum to zero value, and that no electronic emission occurred in rupturing the circuit during the three tests shown in the curves. These curves show that the new contactor is much faster than its predecessors. As shown, the time required to interrupt a 300-ampere current in three tests with the new contactor varied between 0.0156 and 0.0169-second, whereas in three tests with the predecessor contactor the time varied from 0.0131 and 0.0241-second.

Due to the use of aluminum alloys in moving parts and high permeability, rolled steel armature plates and core in the magnetic circuit, the new contactors may be opened and closed with unusual speed, resulting in exceptionally fast response to the master switch. Greater wear resistance has been given the contacts by cold forming them of pure copper, hardened by a special process.

The new contactors are built in 100, 200, 300, 600 and 800-ampere sizes, with the first three available in single pole, double pole and spring-closed forms and the larger sizes in single pole style. Operating coils are designed for continuous operation on direct current voltages of 250 or less and on all alternating current voltages. They are form wound, layer insulated and moisture-proofed by impregnation. A wide steel spring prevents rotation and holds the coil in position on the rolled steel core. Shunts which carry the current from the auxiliary contact arm to a terminal located on the contactor panel are made of special flexible cable of individually tinned strands of wire. Their design is such as to minimize and distribute flexing over the entire length of the cable; too, the cables are of correct length to eliminate whip. Contact spring forces are adjusted to provide uniform contact pressures.

Nitralloy has been selected as the material for such parts as the bearing pin for the auxiliary arm, the steel bushing in the main arm which carries this pin, the main contactor arm and the steel bearing pins which it carries. The insulator is of the molded plastic type. The stationary control circuit contacts on the panel are of silver and are adjustable for contact pressure. They are engaged by silver control circuit contacts which are carried on a phosphor-bronze, double-break bridge.

New Liquid Rubber Resists Abrasion and Corrosion

To protect inside and outside surfaces against abrasion, corrosion and acids, Self-Vulcanizing Rubber Co, Inc., 605 West Washington boulevard, Chicago, has brought out a rubber in liquid form and a rubber in plastic form. The application of this new liquid rubber, called "Self-Vulc," has recently been improved by the development of a new priming compound which makes good results possible by the application of a single priming coat; and both the priming and liquid rubber can be applied like paint—brushed on, sprayed on, dipped on, or poured on.

The rubber vulcanizes itself when exposed to the air. The plastic type is applied with a spatula or other flat tool and, like the liquid, requires only one prime or preliminary coat and vulcanizes itself cold, when exposed to the air. In addition to the protection of surfaces, the material can be used to waterproof or corrosion-proof container portions of machines; to absorb shocks on surfaces subjected to impact; and to silence noises.

Factory Roof Ventilators Are Built of Sheets

Factory roof ventilators of a new type have been developed by F. Meyer & Bro. Co., Peoria, Ill. They are known under the trade name Syphon Air for the reason that they draw or syphon vitiated air from the room underneath. Because of this syphoning action a complete change of air within the room is accomplished much faster than when a ventilator of the same size depending entirely on heat or gravity is used.

The top part of the ventilator revolves on rustless bearings which, aided by a vane, always keep the rear of the ventilator to the wind. Entire construction is of sheets furnished by American Rolling Mill Co., Middletown, O.

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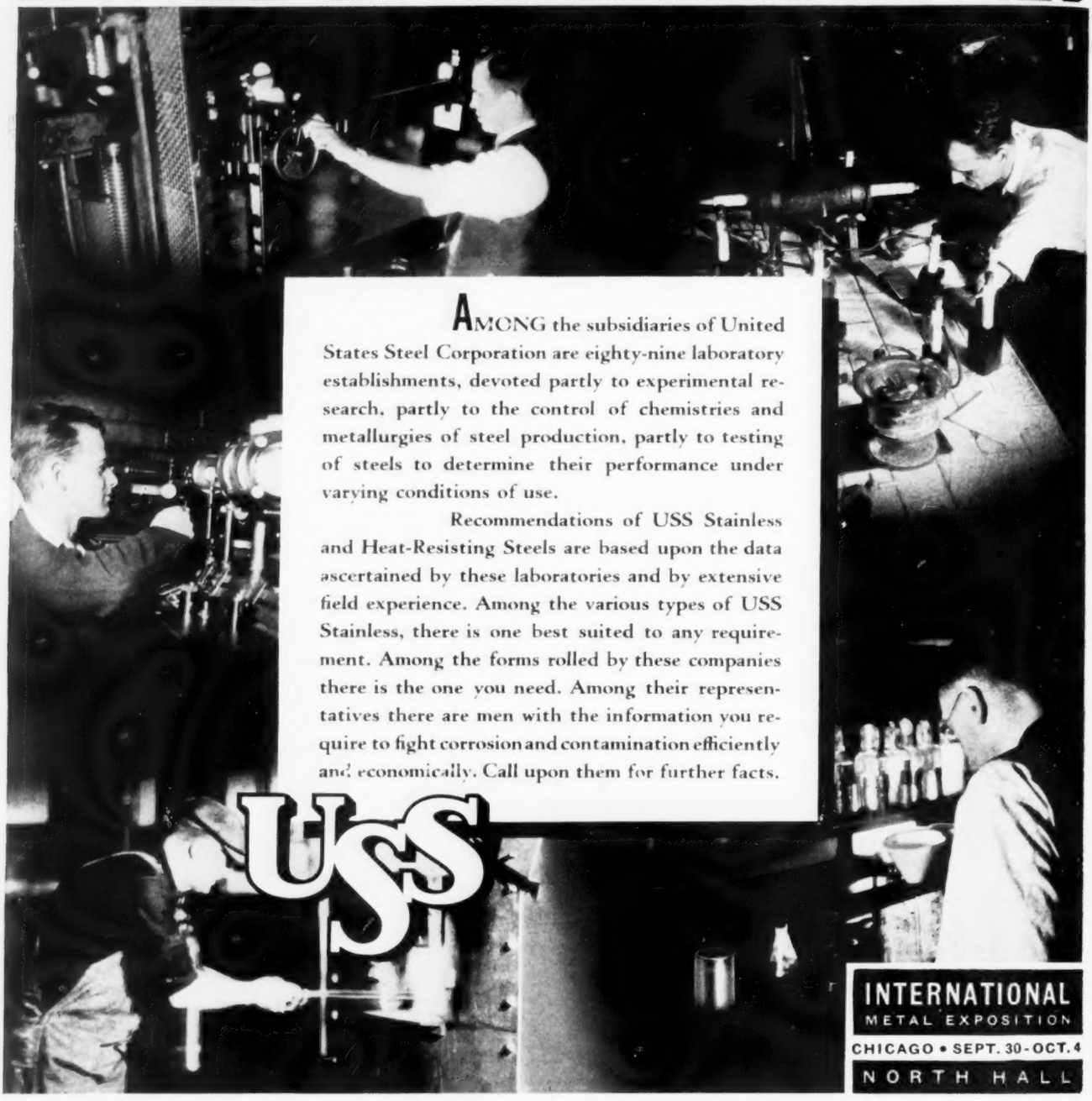

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"Look to the Foreman"—New Keynote of Progressive Industrial Management

BY WILLIAM S. KNUDSEN*

BY THE very nature of modern industry the duties of management are divided into functional classifications. We recognize the general manager, sales manager, production manager, the master mechanic, tool engineer, and so forth, as important units in management, but we are frequently guilty of failure to recognize the foreman as a part of management. Frequently we may be guilty of treating him in the eyes of his employes and others as not being a part of management.

The foreman is an essential part of our scheme of management and it is important that we so recognize him and that he also be made to realize that he is definitely a part of management. If not, where does he belong?

Formerly in Complete Control

In the early part of this century, say up to 1910, shops were run on what we are prone to consider the old-fashioned system, where the department head or foreman had complete control of his men; he knew what was required in the matter of tools and quality and was close to the job all the time. Then came the war with the need for increased output of all kinds. This meant increased production from every man, from every machine, and from every plant. It brought with it a general centralization of everything, particularly tools and methods, and consequently there was need for more record keeping. Oftentimes it seems that the record keeping became more important than the work itself.

We came to regard personnel problems with the handling of men in large masses. In a sense the individual workman became less important than the mass of figures and notes which made up his card in the personnel office file.

Foremen Become Clerks

One of the results of these changes was that as we increased the organization, we made many foremen more or less statisticians, fellows who counted up what was going out of the department and who wanted to place upon the inspector responsibility for the quality of the product.

Under these conditions the foreman became less and less of importance in this scheme of management. Practices and policies were developed which left him shorn of his power in a status where he had only one doubtful privilege, that of eternally being "called down" for something.

The foreman could not hire his men. Sometimes he could not fire them. Often he had little to do with the planning of the job of which he was the nominal head. The responsibility of inspecting his tools was not his until the job had been set up. A tangle of organization lines intersected his duties at every point.

The day when these conditions can be permitted is past. The events which created these conditions no longer exist and the conditions should not exist any more. We must re-establish the order of affairs where the foreman is a part of management on a broader scale. As far as General Motors is concerned, we are turning and have turned away from any conditions of this sort. From now on we are going to look to the foreman for the running of the employes.

A few words about what is being considered — first, quality. Here are both capital and labor. We must look to the foreman for the executive ability to see that labor takes the material and equipment which capital has provided and produces a product or service of the necessary quality. The inspectors are there to assist him but the responsibility for controlling the quality must rest with the foreman. We must also look to the foreman for management ability to see that labor takes the facilities which capital has provided and produces the proper requirements in the matter of quantity. We must, therefore, look to the foreman to supply a large portion of the executive ability necessary to produce the product or service within, of course, cost limits established by the selling price of the product.

Cost Set by Sales Price

Whether we like it or not, it is the selling price which must ultimately determine the cost, and not the opposite. If the selling price is too high we know that the market for the product is reduced. If we reduce the price to try to increase the market, we must also reduce the cost to a point below the selling price or we cease to operate. In competitive industry, it requires a great deal of ability to produce a quality product at a cost below the price at which the product must be sold, and we must look to the foreman for this executive ability.

This brings up another important phase of costs to which we must look

*Abstracted from a paper "Look to the Foreman," presented Sept. 16 at a meeting sponsored by the Cleveland Engineering society in connection with the Third Machine Tool congress in Cleveland. Mr. Knudsen is executive vice president of General Motors Corp., Detroit.

Here's How the World's Arc Welding

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No matter what your welding requirement is, there is a G-E electrode to meet it—an electrode that will do the job fast and economically.

General Electric applies exacting tests to its electrodes. These tests include frequent chemical analyses of the steel, rigid manufacturing inspection, and physical tests of every description. These tests show the 11 G-E electrodes to be superior in strength, ductility, durability, and economy of performance. Moreover, they meet the most conclusive test—actual use—with unqualified success.

3. ENGINEERING SERVICE

There is a G-E welding distributor or a G-E sales office in most large cities—there is one near you. At your request, a representative will be glad to go over your plant layout with you and help you apply arc-welding equipment and methods with which welded products of the highest quality may be produced at substantial savings.

The More We Weld the Better We Serve

GENERAL

Most Extensive User of Can Help You

HERE IS ONE OF THE MANY PROBLEMS SOLVED IN G-E FACTORIES, BY G-E ENGINEERS, WITH G-E WELDING SETS AND ELECTRODES

THIS WAS THE PROBLEM

In the manufacture of the G-E domestic oil furnace, it is necessary that the welds produced be of the highest quality in order to withstand the intense heat of the burning air-oil spray. Also, for the boiler to give the home owner lifetime service, the life of the welds must be equivalent to that of the fire-box steel of which the boiler is constructed. All welding on each boiler must be approved by a boiler-insurance-company inspector before the boiler is permitted to leave the factory.

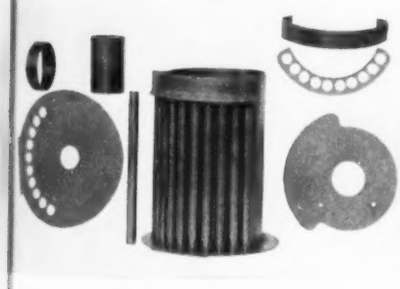
Also, it was essential that arc welding demonstrate its economy as a manufacturing process.

IT WAS SOLVED THIS WAY

G-E multiple-operator welding sets and G-E type W-20 electrode are used in the fabrication of the boiler. Welding operators easily learned to handle this wire, and its use facilitated welding in all positions. Welds are free from porosity and have the high tensile strength, ductility, and corrosion resistance required for the boiler. They have met these requirements under pressure tests as high as 700 pounds per square inch.

The ease of welding with W-20 electrode, and the excellent arc stability of the multiple-operator welder with individual resistor-reactors, made possible increased welding speeds and better quality.

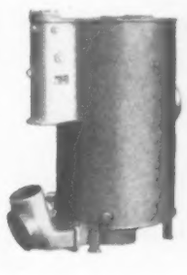
Parts of combustion chamber, and tube drum, for G-E oil furnace



Tubes being arc-welded to upper tube sheet of boiler for G-E oil furnace

Left to right: Water-heater chamber outer shell, combustion chamber, and tube drum

Boiler completely assembled by arc welding with W-20 electrode and G-E multiple-operator welder with individual resistor-reactors



In addition to welding sets and electrodes, General Electric has a complete line of accessories and cable. The G-E welding distributor and G-E sales office nearest you are always ready to give you expert engineering advice and prompt, efficient service. They will be glad to supply you with further information on G-E arc-welding equipment. General Electric, Schenectady, N. Y.

140-31

E L E C T R I C

to the foreman for assistance. The automobile industry pays the highest hourly wage rates of all manufacturing industry, and it has gone further than most industries in improving the quality of the product without increasing the selling price, thus giving the largest increase possible in value. Despite the high hourly wage rates there has been much talk with little reasoning to the effect that the automobile industry should increase its wage rates still more, and should furnish annual wages, profit-sharing and the like. The automobile industry has throughout its history demonstrated its belief in the principle of high wages and an annual wage cannot on any basis of logic be as great as the seasonal wage, without wrecking the price of the product to the consumer. Profit-sharing to employes must imply sharing of losses, so that any attempt to spread ownership can be practical only through stockholders.

Bargaining for Hours

For a moment forget the value of an hour of labor expressed in dollars and cents. What the advocates of excessively high wage rates for certain industries are in effect saying to all other workers is, "You come buy our product, but you must trade two or three hours of your labor for one of ours." Is there any reason why they should do so? Would anyone do so, if he understood the bargain on these terms? Anybody can see that the ultimate effect is for the other workers to refuse to trade on this basis, with the result that trade languishes. If they refuse to trade on that basis, either we must reduce the number of hours they must trade — that is the cost — or else we must cease to operate, and all suffer. We must therefore look to foremen for common sense and ability to assist in maintaining fair and equitable wage rates.

As industrial units grow larger in number of men, the old intimate relationship, which in small institutions existed between employer and employe, becomes extremely difficult. It must be handled through the medium of policies that are fair and equitable to all, and for the more intimate relationship, we must have the co-operation of the foreman to look after this highly important phase of management as it exists today.

Maintaining Labor Peace

Today, when the need for harmonius labor relationships is great for the good of the nation, we must look to the foreman to establish and maintain this harmony, to represent the company and its policies to the workers. With the new twists that have been given to the employer-employe relationship, as a result of the publicity given to collective bargaining, we must look to the foreman for the elimination of the individual grievances which so often fester into serious affairs. We must encourage the workman to take his grievances to his foreman, and we want to help the foreman handle such cases then and there on the basis of their merits and without discrimination. Any rules or laws which purport to establish a new basis of bargaining among employes and employers, cannot be permitted to reduce the foreman's responsibility along these lines, nor will laws ever take the place of it. The substance of my recent experiences in labor disputes can be summed up by saying, "In those plants where there is the best foreman control, there is the least labor trouble."

The matter of a foreman's relations with his employes brings up the question of hiring new employes. A legitimate function of a personnel department is that of filling requests, for it is the function of the department to procure for selection as to skill, which cannot be determined at the gate, the highest grade of men available. But, if the labor supply at the gate does not furnish what the foreman requires, he should be encouraged to get the type of men he needs. The personnel department can, of course, keep an up-to-date file of shiftless and incompetent workers so that such men are not brought back into the plant even in times of labor shortage. With this one restriction, the foreman can be given and should be given a great deal of leeway.

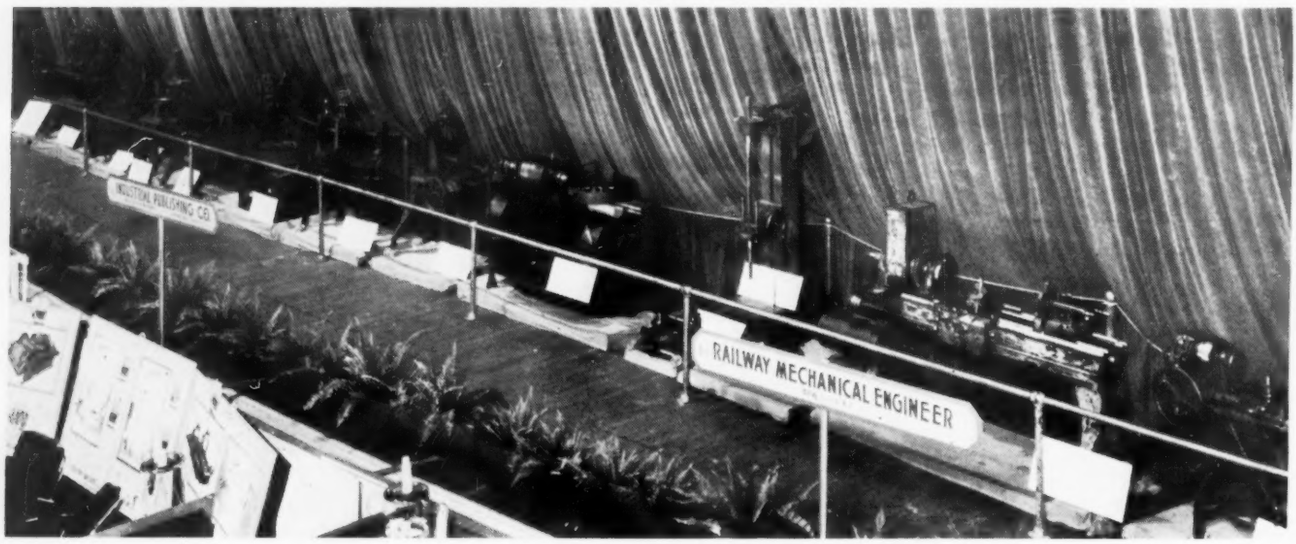
Human Side of Foremanship

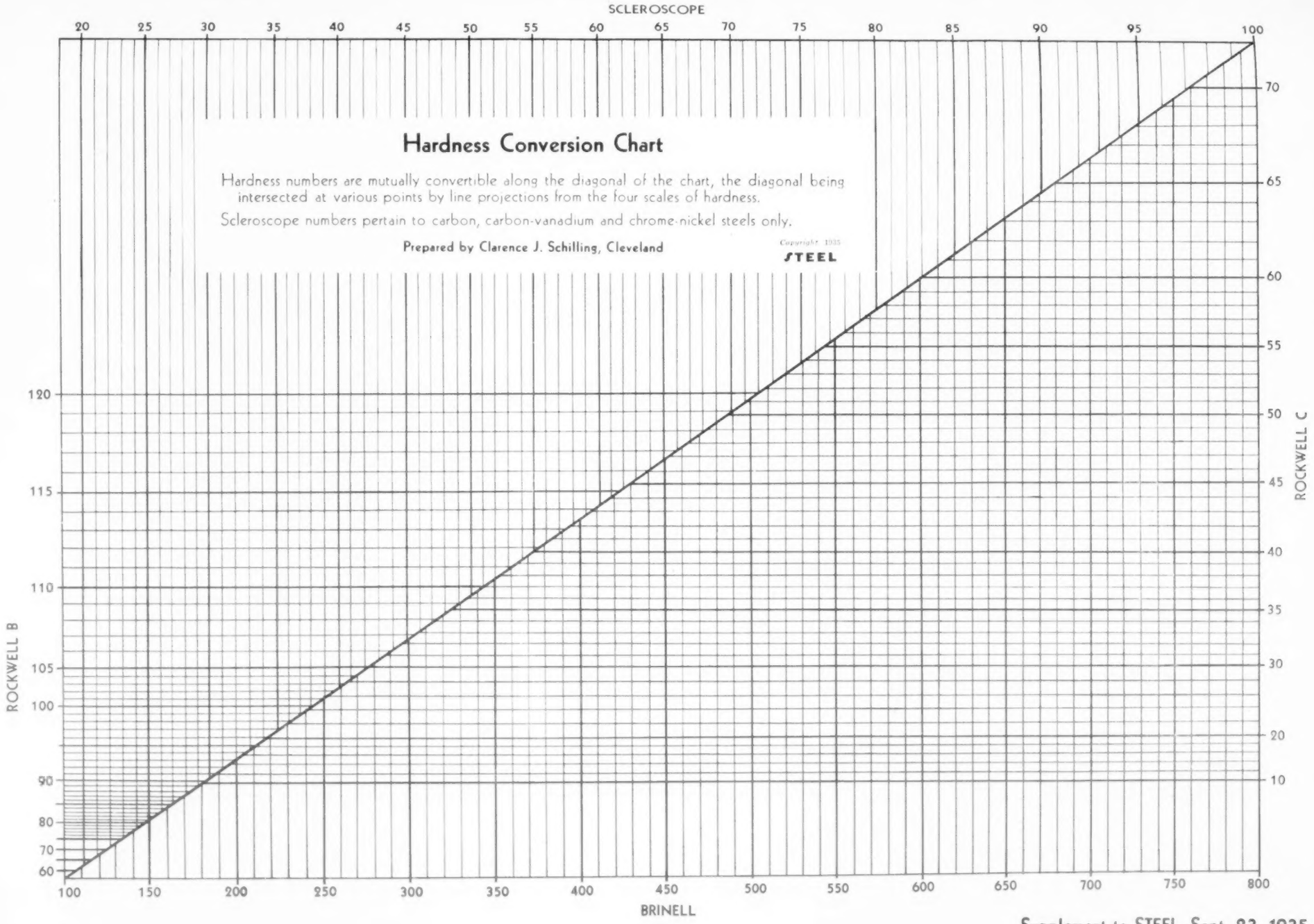
At times our company has had to choose between men of high ability technically, and men of less technical competence who were better able to handle human beings. The latter ability is an art in itself, and should be carefully distinguished from other special abilities. When choosing a foreman, we have usually chosen the man who is first of all able to function in an executive manner — so long as he has enough technical knowledge to understand quality and quantity requirements of the particular product with which he is dealing. It is worth noting that the foreman has two major duties — one to the article being made and one to his men. The second is as important as the first.

The line of authority should be distinguished clearly. In general, there should be but one man responsible for giving the foreman

(Please turn to Page 71)

THIS lineup of machines, remarkable considering that most of them were built around 1860, was set up on the stage of Public auditorium in Cleveland during the Machine Tool Show. Loaned for display by the Edison institute, they provided sharp contrast to the hundreds of glistening new models on display in other sections of the exhibit




SCLEROSCOPE
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Hardness Conversion Chart
Hardness numbers are mutually convertible along the diagonal of the chart, the diagonal being intersected at various points by line projections from the four scales of hardness.
Scleroscope numbers pertain to carbon, carbon-vanadium and chrome-nickel steels only.
Prepared by Clarence J. Schilling, Cleveland
Copyright 1935
STEEL
ROCKWELL B
120
115
110
105
100
90
80
70
60
ROCKWELL C
70
65
60
55
50
45
40
35
30
20
10
100 150 200 250 300 350 400 450 500 550 600 650 700 750 800
BRINELL

METHODS AND MATERIALS

Brass Die Casting Alloy Has Unusual Physicals

A new brass die casting alloy known as Doler-Brass has been developed by the Doehler Die Casting Co., Toledo, O. Containing copper, zinc and silicon, it is adapted especially to the die casting process and results in a fine finish when cast. It has tensile strength of 65,000 to 75,000 pounds per square inch; yield point 30,000 to 40,000 pounds per square inch; elongation 20 to 25 per cent in 2 inches; reduction of area 20 to 25 per cent; brinell hardness 110 to 120; impact strength 30 to 36 foot-pounds. Its color is light yellow.

Other brass die casting alloys developed by the company and previously announced include Doler-Brass, Brastil and Doler-Niklbrass.

S S S

Serves as Bond for Baked Finishes on Steel Surfaces

Alrose Chemical Co., Providence, R. I., announces that its new Jetal process for placing on metal surfaces a lustrous, black finish which will not scratch, chip, peel, scale or discolor, also is being used successfully on iron and steel to form a bond for enamels, lacquers, japan and other baked finishes. This is because this finish is not affected by high temperatures.

S S S

Zinc Alloy Die Castings Are Bent in Fabrication

Bending of zinc alloy die castings is being done regularly in the fabrication of certain parts. Among them are brackets for bathroom mirror lamps. These brackets are produced as die castings of which straight, hollow conduit sections are integral parts. The straight conduit sections are then bent to right or left, depending on the position in which the bracket is to be mounted. The bending operation is performed at about 212 degrees Fahr. the heat being applied in a small gas-fired muffle. The bending operation does not result in any loss of physical characteristics.

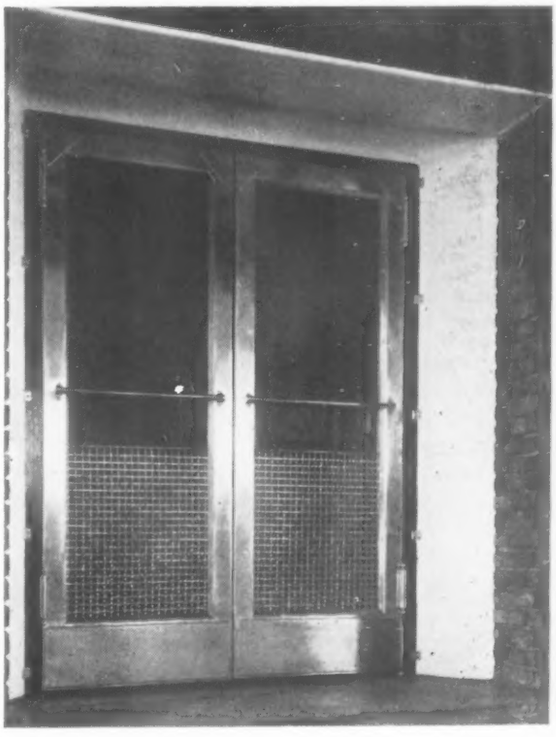
S S S

A Method of Preserving Sheet Metal Surfaces

An interesting process for preserving the surface of sheet metal is described by Samuel E. Edwards, architect, Kansas City, Mo., in *Ingot Iron Shop News* published by American Rolling Mill Co., Middletown, O. Mr. Edwards states the process has been used by him and by his father before him and it is not new. He says the process, described as follows, brings excellent results if properly handled:

"I always use red lead and boiled linseed oil as a first coat; second and third coats of white lead and boiled linseed oil and some japan dryer with a color tint to match the color of the stone; then give the metal a coat of white sand applied with a hand bellows attached to a quart container. It takes a painter

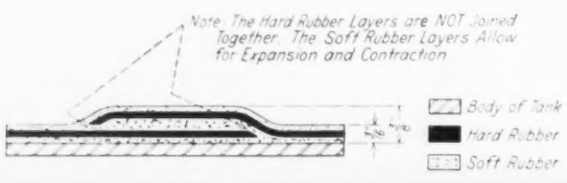
Stainless Steel Screen Doors



THESE SCREEN DOOR FRAMES DO NOT WARP, STICK, RUST OR DISCOLOR. Fabricated by the John Van Range Co., Cincinnati, the frames are of 22-gage stainless steel sheet with No. 4 polish, manufactured by American Rolling Mill Co., Middletown, O. They are wood-filled. The kick plates are 10-gage. Corners were mitred, welded and then screwed to the frame. Mesh is stainless steel wire cloth and hinges are chromium plated. This construction assures durability and permanent beauty

There's an unseen in pickling that may your costs

This Goodrich workman is seen preventing unseen damage. One state of the Vulcalock Process of bonding rubber to steel tanks.


Note: The Hard Rubber Layers are NOT Joined Together. The Soft Rubber Layers Allow for Expansion and Contraction
Body of Tank
Hard Rubber
Soft Rubber

UNLESS you are pickling in one certain type of tank, you are almost certainly running up a big extra expense. It may be unseen today, but soon will be very much in evidence, with heaving floors, sinking walls, machinery out of line.

One mill found the ground 20 feet below its pickling room unfit to support a tank; one had walls 100 feet from a tank settle a foot; many have had machinery heave or settle, and floors give way.

When such expense occurs, it should be charged to past pickling, because it is acid leakage which causes the damage. Acid leaks out into the ground, attacks the minerals there, travels great distances, destroys the foundation under the plant.

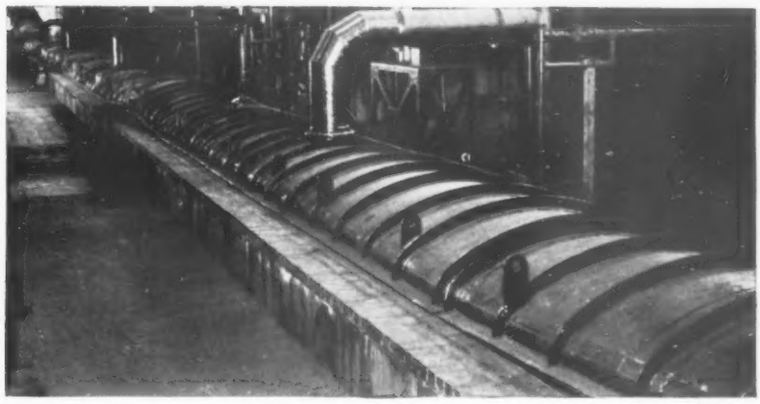
Only Goodrich tanks positively end this unseen damage because only Goodrich tanks stop the cause—acid leakage.

Goodrich tanks are made of steel, lined with Triflex rubber, protected from damage by brick sheathing. Triflex rubber consists of a layer of hard rubber vulcanized between two layers of soft rubber and is fitted with

ALL *products problems* IN RUBBER

Goodrich *Rubber*

damage be raising



"No maintenance expense in 3 years"—says the user of this Goodrich rubber-lined equipment, who insured against unseen damage by having Goodrich lining for tank covers and ventilating fans.

expansion joints to prevent buckling or cracking from expansion or contraction—a patented Goodrich construction.

This triple lining is locked to the steel tank by the Goodrich Vulcalock process which provides an adhesion of 500 to 700 lbs. per sq. in.

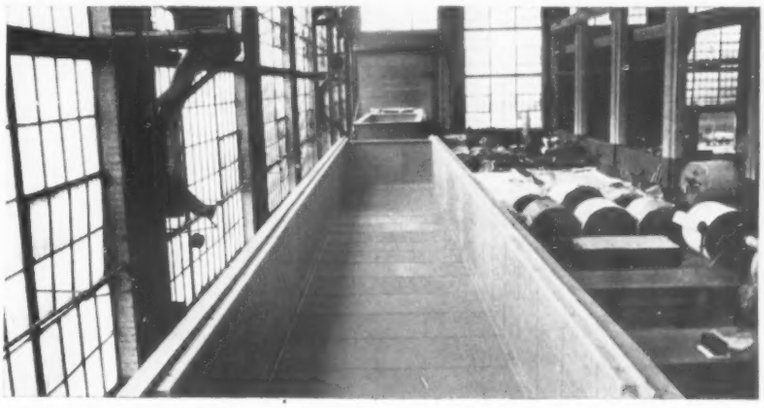
With such a lining there can be no acid leakage. With no acid leakage there can be no corrosion of the tank or foundations.

With no corrosion of the tank, the repairs you now have are saved, and with no migration of acid through the soil, the future damage to walls and floors is prevented.

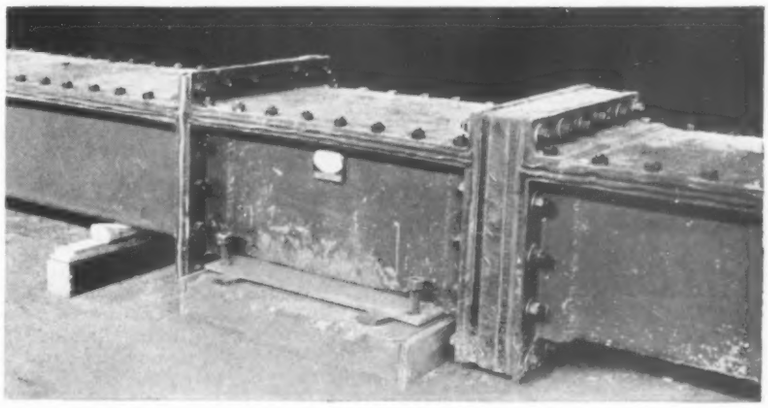
No matter what other type of tank you are now using, you can discard it for a Goodrich tank and see the Goodrich tank pay for itself in a few years, and then go on paying you dividends for years after.

For prices and a free sample of Triflex lining, write The B. F. Goodrich Co., Mechanical Rubber Goods Division, Akron, Ohio. (In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont.)

Brick-sheathing and Triflex-lining will prevent acid leakage and tank repairs for years in this strip pickling unit.



Tank, lined with Triflex in the Goodrich factory, and ready to be shipped complete to the user.



Even in sewers, trouble may brew, unless they are Triflex-lined and equipped with Goodrich rubber expansion joints.

Lining

of great experience to keep the work from becoming cloudy. A good workman will create a perfect imitation of stone, and it gives the best possible surface protection. A machine sander would be difficult to use because it would generally blow away the paint.

"On columns and finer work, it would be well to blow off all the loose sand from the first coat and then give an extra coat of paint and an extra coat of sand. With ordinary care this kind of job will create a surface which will last as long as the average building.

"This method of painting and sanding makes an excellent finish for steel houses, garage buildings, filling stations and similar structures, and should eliminate any depreciation on this type of building."

Industrial Propane Is Used for Many Different Purposes at Steel Foundry

BY W. Z. FRIEND and E. A. JAMISON
Philgas Division, Phillips Petroleum Co., Detroit

GENERAL STEEL CASTING CORP., Eddystone, Pa., producer of heavy steel castings, particularly for the railroads and heavy equipment builders, sharply has increased its consumption of industrial propane as a result of applying it in many additional ways in its manufacturing operations. The company's original propane storage plant consisted of one 5000-gallon tank which was filled by tank truck. This has been replaced by a tank with 15,000 gallons propane capacity which is filled from tank cars.

This tank has 87 inches inside diameter and is 57 feet, 4 inches long, constructed in accordance with the A.S.M.E. unfired pressure vessel code for working pressure of 200 pounds per square inch. In it propane is stored as a liquid which vaporizes inside the tank and passes out as a gas through suitable pressure regulators and thence into service piping to the various gas burning appliances. Propane is piped around the plant at 30 pounds pressure with an individual regulator at each outlet for reducing to the pressure desired for each job. Unusual success characterizes the cutting of risers at this plant with oxy-propane torches and without resorting to the use of an oxygen lance, which is unusual in view of the fact that some of the castings produced have risers up to 21 inches in diameter. It is believed that the principal reason for the success of this method of cutting is the fact that the flame temperature of a mixture of oxygen and propane melts a minimum amount of metal on each side of the flame, with the result that less molten metal flows down into the cut.

Used To Heat Core Oven

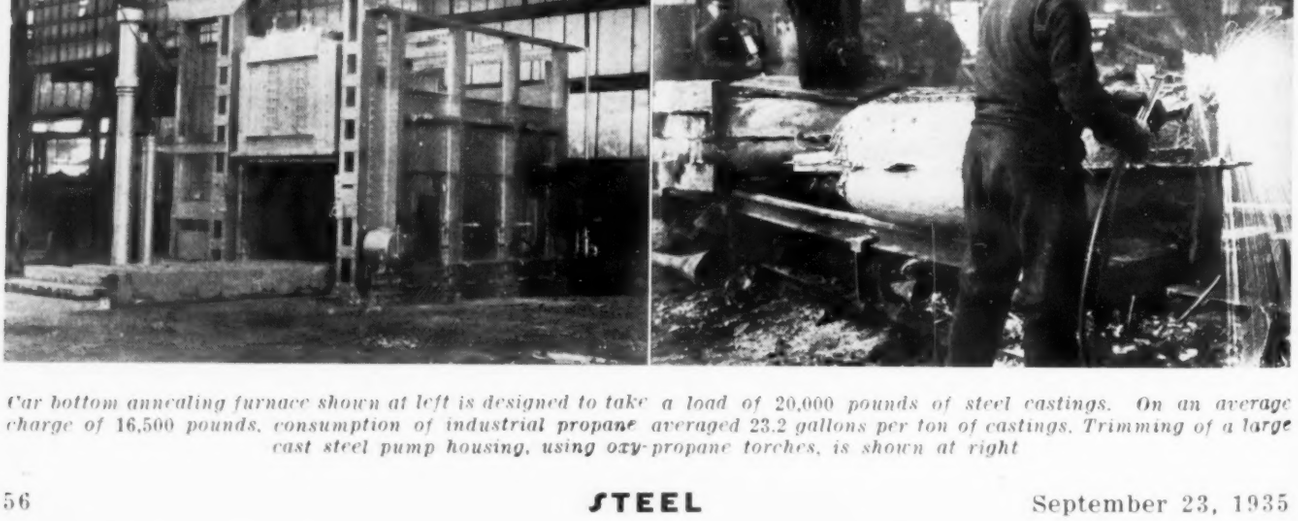
Industrial propane also is being used at this plant to heat a two-section, insulated, sheet steel oven for baking cores and aging small molds. The larger section of this oven is 11 x 10-feet and 9 feet high and is fired with a 3-inch pipe burner having thirty-six 1-inch lava tips. The small section is fired with a similar burner having twenty-one 1-inch lava tips. Propane is delivered at 30 pounds pressure to high pressure inspirators. Operating temperature covers a range from 400 to 600 degrees Fahr. and is controlled through electric motor-operated valves. The cores are placed on portable racks which are moved about the foundry on small electric trucks of the lift type.

Mold drying also is accomplished with propane, using eight 2-inch, high pressure inspirator burners which are adjusted to give a large flame. When placed over one of the openings in the mold they develop a long, lazy flame which penetrates to all sections of the mold. The high specific gravity and low rate of flame propagation of the propane are said to be particularly advantageous in this operation, causing a portion of the gas to settle readily to the bottom of the mold and burn there.

Firing Annealing Furnace

A large, car bottom type, annealing furnace, designed to take a load of 20,000 pounds of steel castings and to operate at maximum temperature of 1800 degrees Fahr., also is operated with industrial propane. It is fired with 12 high pressure inspirators with refractor tip burners, six burners being located on each side of the furnace. In operation the usual heating-up period is six hours followed by a holding period of six hours. On an average charge of 16,500 pounds of steel castings, total propane gas consumption was 6890 cubic feet, or an average of 23.2 gallons of propane per ton. Average per pound of castings was 1065 B.t.u.'s.

Another unit served by propane is a 6-ton electric steel melting furnace with a rating of 350 kilovolt-amperes. This is preheated with industrial propane, thereby speeding up the pre-



Car bottom annealing furnace shown at left is designed to take a load of 20,000 pounds of steel castings. On an average charge of 16,500 pounds, consumption of industrial propane averaged 23.2 gallons per ton of castings. Trimming of a large cast steel pump housing, using oxy-propane torches, is shown at right

SPRING MAKERS
FOR A FULL HALF CENTURY

Our business is to produce correctly any conceivable spring or wire form for any conceivable use.

This has been our business for fifty years.

Long, long ago we learned that to make the finished product function correctly, we had to use the one correct wire and the one correct method.

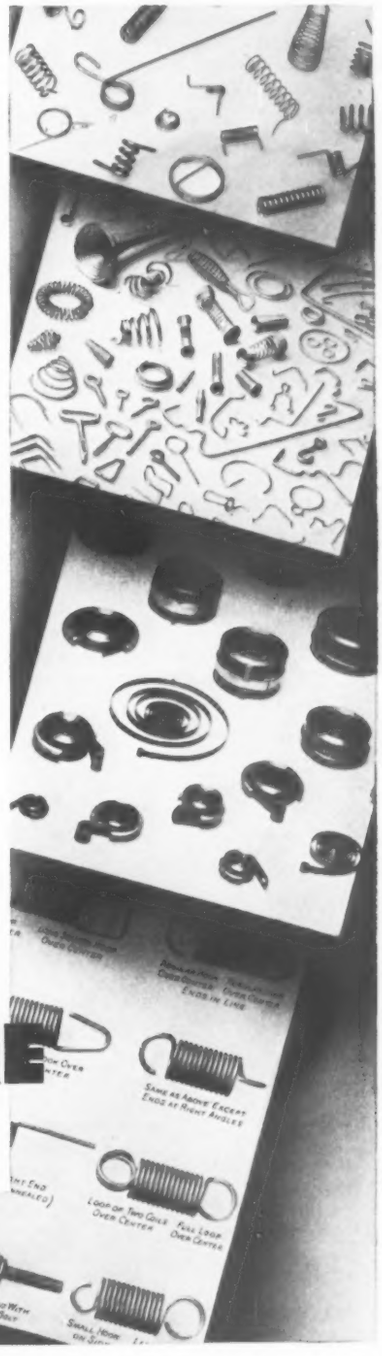
That is the wire, that is the method we use.

That is likewise why you *save* when you buy from WICKWIRE SPENCER.

WICKWIRE SPENCER STEEL COMPANY
New York City, Buffalo, Chicago, Worcester;
Pacific Coast Headquarters: San Francisco;
Warehouses: Los Angeles, Seattle, Portland.
Export Sales Department: New York City.

THIS TEXT BOOK *treats upon various kinds and characteristics of spring wire, gives valuable formula relative to spring design. Send for a copy.*

CONSULT FREELY . . AND CONFIDENTLY
. . WITH OUR ADVANCED TECHNICAL
SERVICE DEPARTMENT



VISSCO WIRE
by Wickwire Spencer

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

heating period and considerably reducing the operating cost of the furnace. Preheating is done with two 2-inch, high pressure inspirators and burners operating at 30 pounds pressure. After the furnace has been preheated and charged propane continues to be burned in the furnace to assist in maintaining a neutral atmosphere and to supply as much heat to the operation as possible in order to reduce the electrical demand and consumption.

Equipment in the repair department includes a high temperature oven furnace used for repairing high speed tools and for heating bar stock for forging; an oven furnace used for annealing; a forge furnace used for heating bar stock for forging small tools; a soft metal furnace used for oil tempering; a salt bath. All these units are heated by propane at 30 pounds gas pressure through inspirators and tunnel type burners. Brazing is done with torches adapted to use propane; this operation is performed principally to build up sections and to repair sections where heavy strains are not encountered.

Pilot lights for lighting the powdered coal burners under the plant steam boilers are operated on propane. Two 1-inch, high pressure inspirators with flame retaining nozzles are used, two pilot burners being provided for each coal burner. The propane operating pressure is 30 pounds per square inch. A propane fired steam boiler heats the office building during late Fall and early Spring when the regular plant heating system is not in operation. This boiler is equipped with 16 burners operating at 15 inches water pressure. The company operates a cafeteria in which all heating and cooking equipment is operated with propane.

Of particular interest is the fact that industrial propane is used at pressures varying from 15 inches water pressure up to 30 pounds throughout the plant without the use of compressors, boosters and associated control equipment.

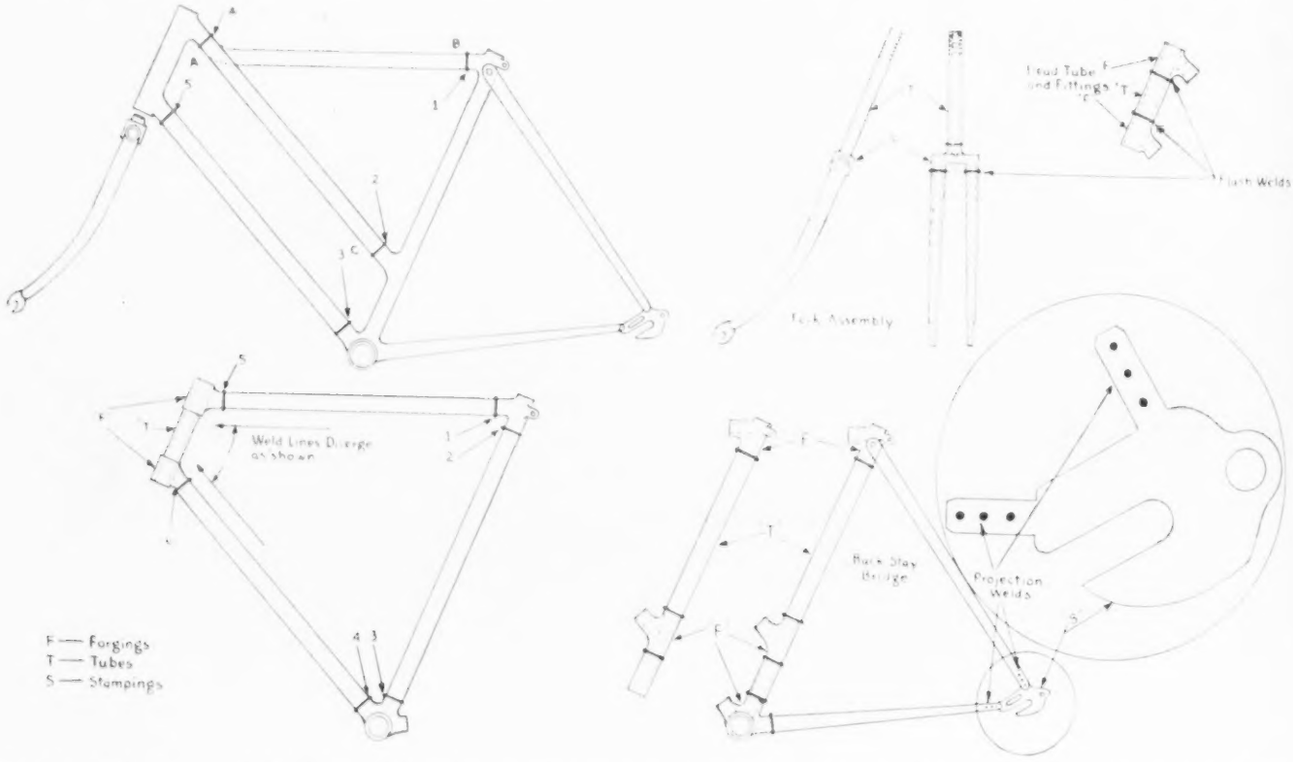
Bicycle Manufacturers Use Resistance Welding To Improve Their Product

RECENT revival of the popularity of the bicycle in this country has confronted bicycle manufacturers with the same problems that faced the automobile manufacturers, namely, to cut down weight without sacrificing strength, to improve appearance and, most important of all, to reduce costs, according to *Flashes*, published by the Thomson-Gibb Electric Welding Co., Lynn, Mass., and Bay City, Mich.

In driving at these results, resistance welding is being used to a large extent in the manufacture of bicycles and the accompanying sketches illustrate the scope of the use of this method as applied with a flash welder of 30 to 50 kilovolt-amperes capacity. The flash welds are made without overlapping of metals and the weight is kept down without loss of strength. The unbroken lines are in keeping with modern streamline design. The process is applied in minimum time and with minimum cost. Once the parts are clamped together, an operation which is facilitated by special clamps and work locators, the welds are made in 3 or 4 seconds each. Production of 150 to 250 welds per hour is not unusual.

The upper left sketch shows a way to make one head assembly serve for both boys' and girls' bicycles. On a boy's model, the tube marked *AC* and the corresponding fitting on the back post are eliminated. Welds 1 and 3 are made separately and then 4 and 5 are made simultaneously. On a girl's model, the top fitting and tube *AB* are omitted.

At the upper right are shown details of the fork assembly and the head assembly. The lower right sketch shows the back stay bridge assembly and an enlarged view of the chain stay end. A low cost stamping with projections embossed on both sides is inserted in the tubes and projection welded in a welding press. The result is greater



Details of design for fabrication of bicycles by resistance welding are shown in these sketches. That at the upper left shows a head assembly for both boys' and girls' bicycles. At upper right is shown the fork and head assembly. At lower left is shown a method of assembling a boy's bicycle, while at lower right is shown the back stay bridge assembly with an enlarged view of the chain stay end

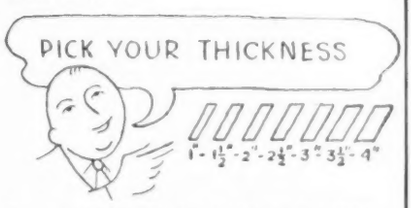
REASON No. 1

Made of especially selected and calcined diatomaceous silica, blended and bonded with asbestos fibre, Superex has unusual heat resistance. For many years, it has proved its dependability under severe service behind refractory linings in high-temperature furnaces.

REASON No. 2

Its remarkably low thermal conductivity means that, for the same insulating value, a lesser thickness of Superex is required than any material of equivalent heat resistance.

REASON No. 3



Superex is furnished not only in the thicknesses shown above, but also in any intermediate thickness desired. No waste; you buy only the thickness you need.

5 Reasons Why

J-M SUPEREX BLOCKS behind your Refractory Linings

FOR MANY YEARS, in many thousands of installations, Superex has proved itself the superior block insulation for high-temperature industrial equipment. Recently, it has been made even more efficient, even more resistant to high temperatures than ever before.

Here, briefly, are five important reasons why Superex, used behind refractory or semi-refractory linings, will give you trouble-free service and maximum efficiency and economy.

REASON No. 4

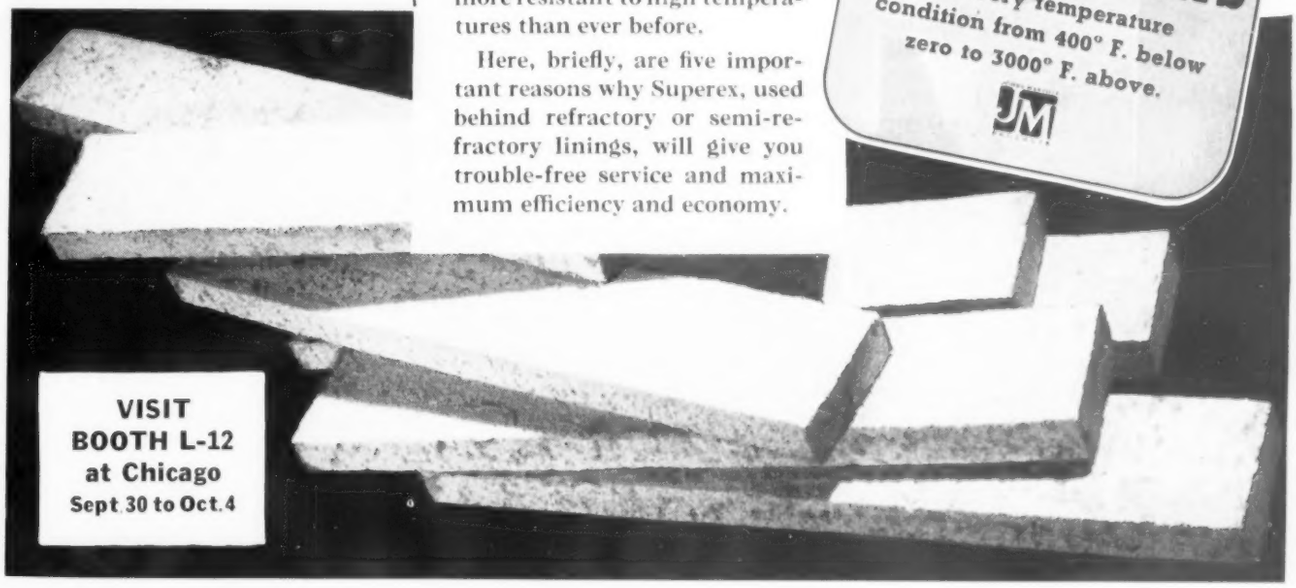
Blocks are large (up to 12" x 36"); they are light (23 lb. per cu. ft.). Superex goes on quickly, economically—as much as 3 sq. ft. at a time—with marked savings in labor cost.

REASON No. 5

No matter what insulation you use, or how carefully you apply it, there's bound to be heat leakage through joints. Heat passes through joints like water through a sieve.

But with Superex Blocks, because of the large-size units, such losses are reduced to a negligible degree.

Johns-Manville
INDUSTRIAL INSULATIONS
For every temperature condition from 400° F. below zero to 3000° F. above.



A Few Uses for Superex

You will find Superex Blocks especially well adapted for the insulation of slab heating, annealing and all types of controlled atmosphere furnaces, producer gas mains, hot-blast stoves, open hearths and regenerators, and boiler furnaces.

Superex is also available in the form of pipe insulation for superheated steam and hot oil and gas lines.

Free Data Sheets on Superex Blocks, Sil-O-Cel Brick and other Johns-Manville insulations for high-temperature furnaces mailed on receipt of coupon.

JOHNS-MANVILLE,
22 East 40th Street, New York City

Send me data sheets on Insulation of Industrial Furnaces and Ovens, including information on Superex Blocks.

Name_____ Title_____

Firm Name_____

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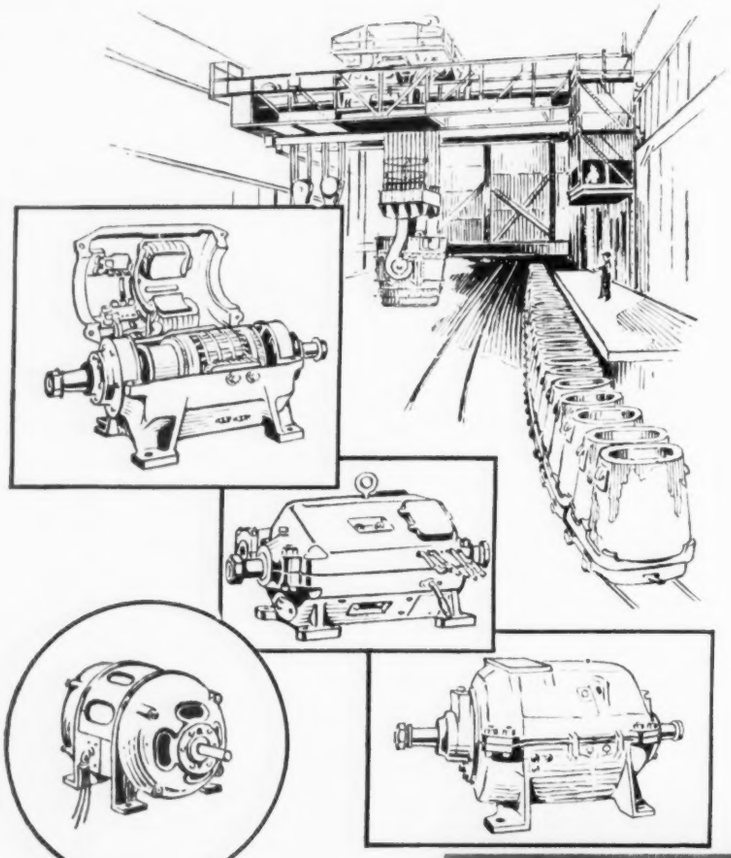
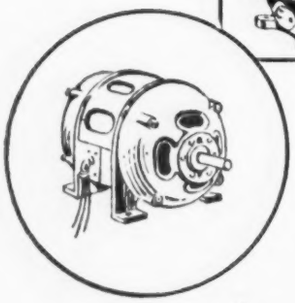
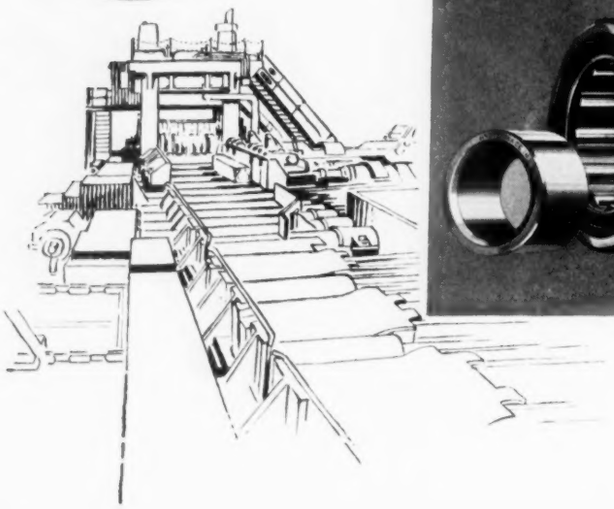
S-9-35

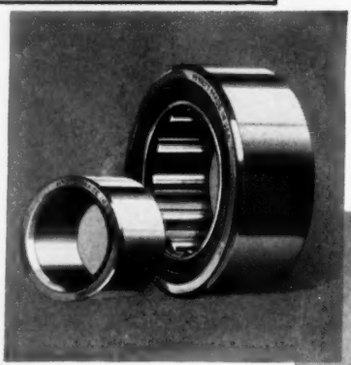
HYATT

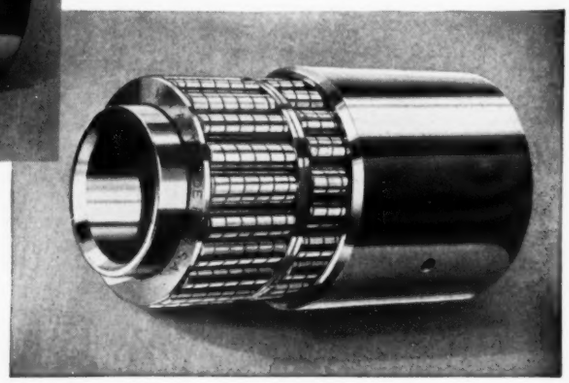
In the Operating Equipment











The following manufacturers of steel mill equipment regularly employ Hyatt Roller Bearings in their production or can furnish Hyatts in their equipment upon specification:

Mesta Machine Co.
Morgan Engineering Co.
Alliance Machine Co.
Aetna-Standard Engineering Co.
Cleveland Crane & Engineering Co.
Harnischfeger Corp.
Whiting Corp.
Shaw-Box Crane & Hoist Co.
Pittsburgh Steel Fdry. Co.
Continental Roll & Steel Fdry. Corp.
Lewis Foundry & Machinery Co.
Treadwell Engineering Co.
Birdsboro Steel Fdry. & Machine Co.
Hillyard-Newbold Co.
Pennsylvania Engineering Co.
International Clay Machy. Co.
Wellman Engineering Co.
E. W. Bliss Co.
Morgan Construction Co.
Shepard-Niles Crane & Hoist Corp.
Westinghouse Electric & Mfg. Co.
General Electric Co.
Crocker-Wheeler Electric Mfg. Co.
Diehl Electric Mfg. Co.
Reliance Electric & Engr. Co.
Atlas Car & Mfg. Co.
Hardie-Tynes Mfg. Co.
Mackintosh-Hemphill Co.
Arthur G. McKee Co.
Wm. B. Pollock Co.
Koppel Industrial Car & Equip. Co.
Surface Combustion Corp.
United Engineering & Fdry. Co.
—and others.

is serving

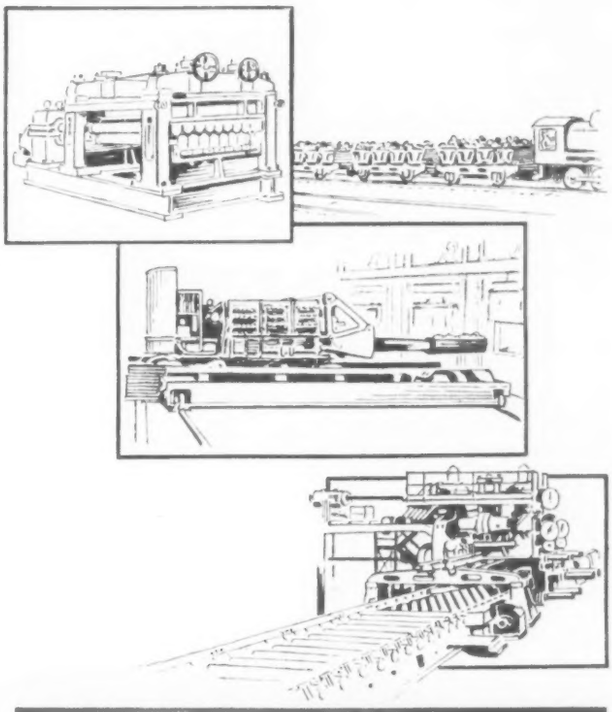
of Practically Every Steel Mill

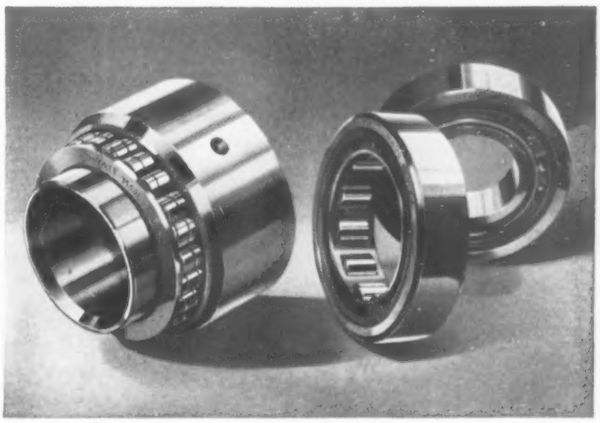
Wherever Hyatt Roller Bearings serve they save too, and that is why they are so universally employed in steel mill service.

They save wear and tear on the equipment and help give it longer life. They save lubricant and the time necessary to apply it. And because they substitute true rolling motion for sliding friction, they effect considerable power saving.

The countless thousands of Hyatt Roller Bearings which for years have served in steel mills are advance proof of how well and how long the new thousands will carry on.

Tables and cars—cranes and motors—equipment of every description — with Hyatt Roller Bearings as an integral part is your assurance of more efficient and economical operation. Play safe and specify these better bearings. Hyatt Roller Bearing Company, Newark, Detroit, Chicago, Pittsburgh, San Francisco.





HYATT

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

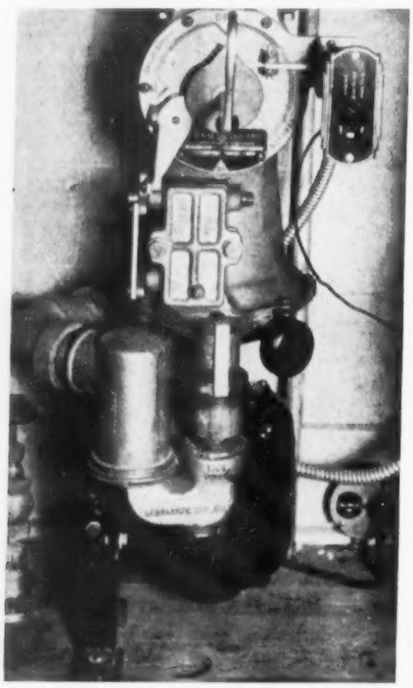
economy in production, greater speed in assembly and greater strength in the finished product.

The sketch at the lower left shows another method of assembling a boy's bicycle by flash welding. Because the diverging lines of welds 5 and 6 make it impossible to use the welded head assembly shown in the second diagram, the head fittings are welded separately and the tube is pressed and pinned in place.

Garbage Can Is Superseded By Waste Food Grinder

General Electric Co., Schenectady, N. Y., has developed an electric grinder, shown in the accompanying illustration, which is intended to supersede the old-fashioned garbage can. Driven by a ¼-horsepower motor and installed beneath the kitchen sink, the new unit grinds waste food and converts it into a fine pulp which is flushed by water through the sink drain and carried away as part of the sewage stream.

In view of the contact with water and with food acids, the selection of



Close-up view of new kitchen waste eliminator as installed under sink. It grinds waste food into a pulp which is flushed down the drain

materials of construction for this unit was worked out carefully. The housing, motor coupling, control handle and a number of small parts are high purity zinc alloy die castings. The propeller, main bearing, shredder housing and strainer disk are nickel aluminum bronze die castings. The cutting blades are cemented tungsten carbide.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

An Opportunity

THE depression disclosed a vital weakness of the steel industry—too much capital investment per ton of output. The steel industry, unlike the railroads, will proceed to remedy the trouble now before the government gets a deadening grip of regulation on the steel business.

Among the many types of knowledge and experience that will be applied to the job is the viewpoint and technique developed by the welding industry. Heretofore, welding in a steel plant has been merely a means of repairing something that has been broken. The fact that everything that can be broken will be broken in a steel mill has bred familiarity with the welding processes. From this familiarity with the welding processes has developed a number of ideas for saving money in the making and rolling of steel.

The butt welding of billets in Europe and butt welding of strip coils here are merely obvious applications of welding. The knowledge developed in welding possibly may be applied to the art of making steel to reduce greatly the capital investment. Certainly, no one can observe the precision with which alloy steel is made in the arc welding process without thinking of the possibility of a continuous process of making steel from ore.

The steel industry is faced with the necessity of doing a better job and the steel industry has never backed down on that sort of proposition.

Craftsmanship

Young men who go in for welding as merely a job or as a career should learn the craft of welding. Craftsmanship is in great demand in the welding industry at present. There is no easy way to be found through an engineering course which will permit a man to start at the top.

Of course, an engineering course with a parallel development of craftsmanship is the most desirable. But the young gentlemen with the blue shirts and the yellow neckties should not try to dodge the necessity of perfecting their craftsmanship.

Sparks and Flashes

No one can rest long on his laurels in the welding field; the rest is too likely to be permanent. Flash welding strip coils is a good idea. Now comes the automatic carbon arc, offering stronger metal in the weld than in the strip itself. Multiple tip oxyacetylene welding torches make a bid for attention. The uproar is great. Out of the situation will come the fact that there is not just one problem and one best answer, but many problems and many answers.

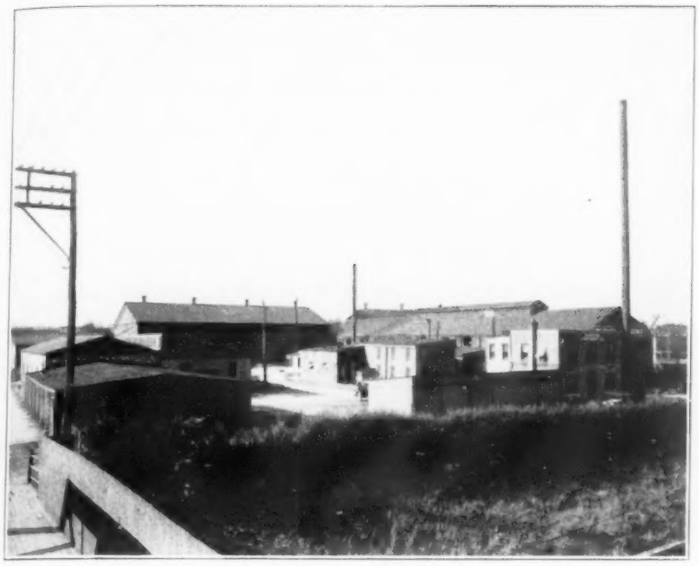
* * *

When all the multitude of schemes for inflating credit get to working at the same time, industrial management would do well to see that the welding department is reorganized and propertly equipped. Most welding departments have grown wild and weedy in the matter of equipment and practices. Under such conditions welding costs too much. Welding will be an increasing factor in manufacture involving metal from now on.

* * *

The Japanese are probably the world's finest craftsmen in welding. Until recently, their engineers and scientists have been busy doing other things. Their system of buying equipment is so ponderous that not a great deal is in use. By the time everyone gets a commission on what he buys, the equipment costs so much the firm cannot afford to buy it.

THEY CUT STEEL CASTINGS
AND COSTS★Too . . . . . with
HARRIS CITY GAS TORCHES



Plant of Atlantic Steel Castings Company, Chester, Pennsylvania, monthly capacity 550 tons acid open hearth steel castings from 1 to 10,000 pounds.

The Atlantic Steel Castings Company of Chester, Pennsylvania adopted Harris City Gas Cutting Equipment. Pertinent facts on their experience are given in the letter reproduced below -

THE ATLANTIC STEEL CASTINGS COMPANY
CHESTER PENNSYLVANIA

August 2nd, 1935.

Harris Sales Company,
1428 S. 56th St.,
Philadelphia, Penna.

Gentlemen:

Having just completed a thorough and extensive check on the operation of your city gas cutting torches on the cutting of steel castings in our plant, we find that substantial savings are being made. For your information our acetylene cost per hour of cutting was $.55. The city gas cost per hour of cutting is approximately 7¢ which gives an economy of a little over 87% in favor of city gas.

In addition to making the substantial reduction in fuel cost, we found that our oxygen consumption has been decreased 15 to 20%. This last was quite surprising to us as we had been informed that our oxygen consumption would increase with the use of city gas. The cutting speed of your oxy-city gas torch is comparable with that of the oxy-acetylene torch and we are able to maintain our regular production schedule.

From the above you will see that we find city gas quite satisfactory for our work.

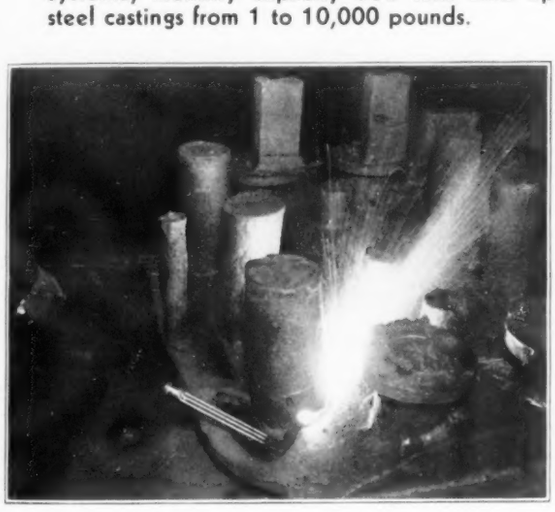
Yours very truly,

THE ATLANTIC STEEL CASTINGS COMPANY

RSM.B

R. S. Munson

Vice President.



Harris City Gas Torch cutting off a 9" riser at The Atlantic Steel Castings Company plant in Chester, Pennsylvania.

★ Fuel cost per cutting hour is 7c with City Gas, against 55c with Acetylene. The Oxygen Saving Is 15% to 20%.

It will pay you to make a "thorough and extensive check" on your cutting costs.

• *Offices in all Principal Cities*

THE HARRIS CALORIFIC COMPANY

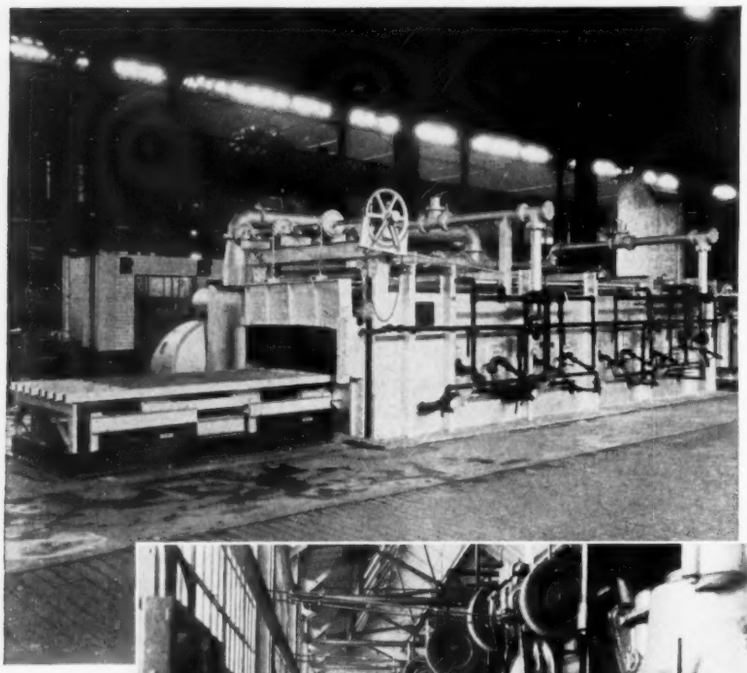
"Serving the Metal Industry since 1905"

CLEVELAND, OHIO

CUT COSTS . . .

WITH THE NEW FACTS ABOUT GAS

Walking beam gas-fired normalizing furnace improves the quality of tin plate.



Battery of gas-fired forges cuts cost in this shop and adds to cleanliness.

Recent research, sponsored by the American Gas Association, has developed methods of using gas in industry which both improve quality of product and lower production costs.

This research has made gas available for many processes on a more economical basis than ever before; it has been an important factor in the development of new equipment which uses gas more efficiently and more economically; it has made possible and practicable the accurate control of furnace atmospheres which play so important a part in improving product quality; and in many processes it has speeded up production, improved quality, cut spoilage loss and definitely reduced over-all costs.

In this new research data on gas and gas combustion, there

●

Visit the Industrial Gas Exhibit at the National Metal Exposition

AMERICAN GAS

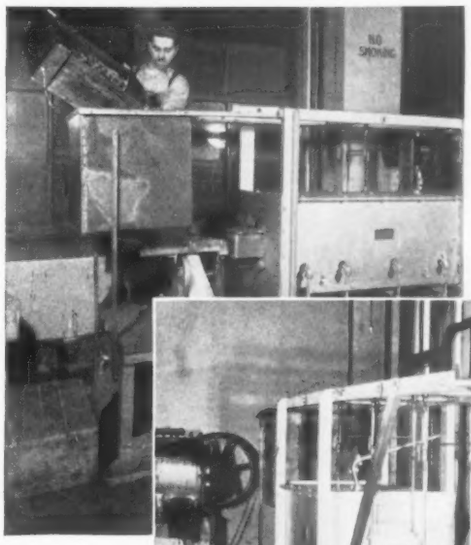
INDUSTRIAL GAS SECTION · 420

IMPROVE QUALITY

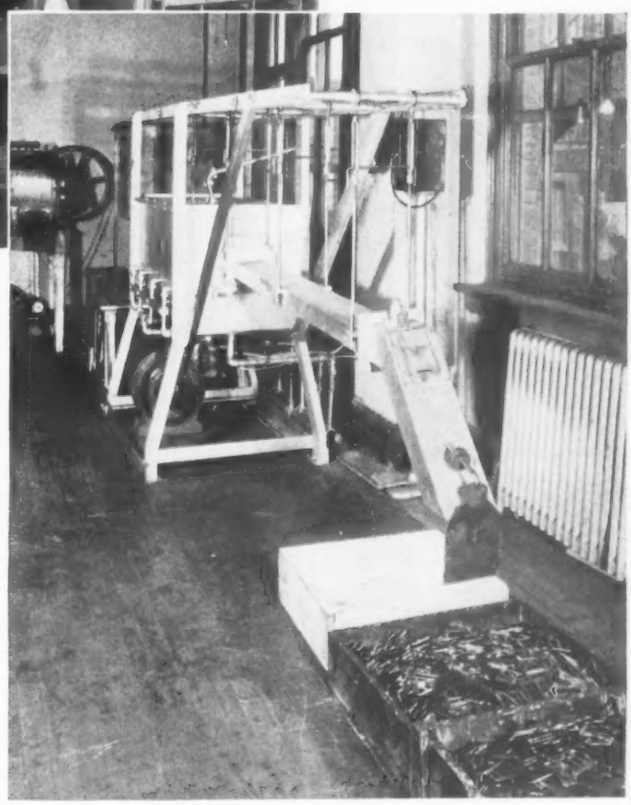
DEVELOPED THROUGH RECENT RESEARCH

may be important information bearing on your own special problems. So why not get in touch with your local gas company industrial engineer, and have him study your heating processes.

He will be glad to give you, without charge, an accurate analysis of just what gas can do for you in the light of today's advanced knowledge of its possibilities.



High quality small steel parts clean-hardened at low cost in this furnace.



IMPORTANT!

Copies of the following research reports are available to interested executives, WITHOUT CHARGE.

1. The Influence of Atmosphere and Temperature on the Behavior of Steel in Forging Furnaces.
2. The Surface Decarburization of Steel at Heat Treating Temperatures.
3. Baking Practice for Oil—Sand Cores.
4. The Application of Heat To Core Baking.
5. The Effect of Operating Temperatures on the Combustion of Industrial Gas.
   - Bulletin No. 1: Study of Combustion Chamber Wall Temperatures.
   - Bulletin No. 2: Practical Explanation of Newly Developed Combustion Knowledge.
6. A Study of the Characteristics of Burning Gas With Preheated Air.

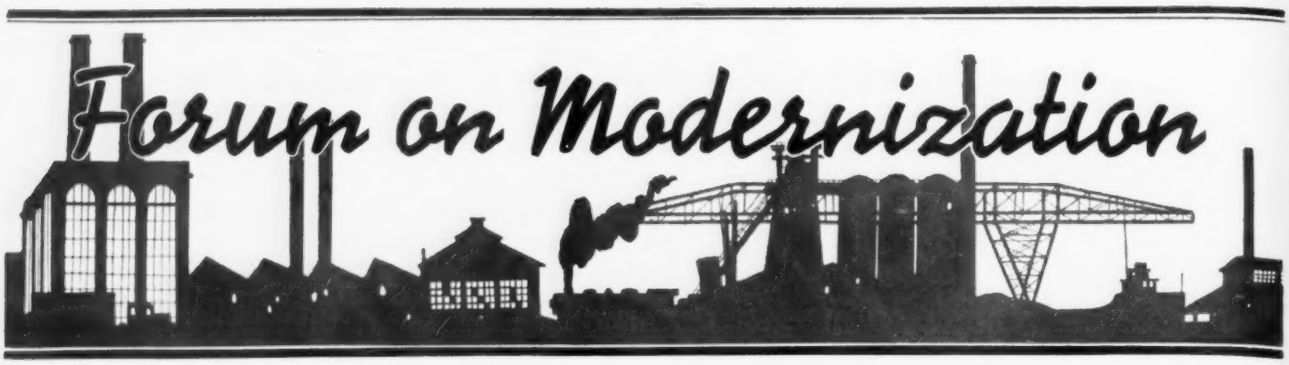
See your local gas company, or write direct to American Gas Association, 420 Lexington Ave., New York City.

THE TREND TODAY IS TO GAS

THE MODERN INDUSTRIAL FUEL

ASSOCIATION

LEXINGTON AVE., NEW YORK CITY



Technical Progress Provides Stimulus For Modernization of Equipment

BY N. G. SYMONDS
Vice President in Charge of Sales,
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

GABA213 DPR--WUX AUG 4 1935
409P

THE ———— STEEL COMPANY HAS MADE APPROPRIATION FOR NEW MILL STOP SENDING PRELIMINARY SPECIFICATIONS LATER IN WEEK STOP LOCAL PEOPLE BELIEVE THIS ONLY THE BEGINNING OF EXTENSIVE IMPROVEMENTS

(SIGNED)

DISTRICT SALES MANAGER

SALES records of Westinghouse business from the steel industry for the first months of 1935 are at a higher average than the five years preceding the depression and such telegrams as the above indicate that they may continue at this relatively high level. It is significant that this business has in general resulted from modernization efforts which have been steadily stimulated by research and development of more efficient electrical equipment for the steel industry.

During the depression there has been every endeavor on the part of manufacturers to conserve resources. During this period there has been a large, accumulated demand for production equipment. Machinery and equipment have advanced in obsolescence, both due to wear and tear, due to the initiative on the part of the engineering fraternity connected with manufacturers and their suppliers in the development of new machines.

The steel industry is a good example of this situation. Manufacturers of steel making and handling machinery have been developing improved apparatus for manufacturing certain classes of steel, particularly at higher rates of production. In other words, machinery has become more automatic. Correspondingly, steel mill engineers and superintendents have been analyzing manufacturing problems closely, with a view to preparing for the changed and increasing demand with the return of business.

Westinghouse has done much the past few years to advance technical progress in anticipation of the revival of the steel industry. For example, there is an automatic circuit breaker that is replacing fuses in the electrical circuits of many steel mills and guarding investments in materials, men and machines.

Synchronizing Operations

Another recent and slightly more technical development which is aiding modernization is an "electrical driveshaft" or synchro-tie. This comparatively new device is being rapidly adapted to steel mills for obtaining visual indication of speeds and other operations at distances from the machines since it substitutes motors and a few wires for mechanical shafting, bearings, gears, etc. When used in conjunction with control drives, such as automatic screwdowns, it enables several operations to occur in synchronism, without complicated control schemes. The synchro-tie is also extremely valuable as a signalling device in continuous mills because of the distances involved. The inspector on the floor can signal to the roller visually and by an alarm bell when some condition is not right at the same time indicate what is wrong.

Many individual developments such as these have contributed to the automatization of steel mills, which in turn has lowered the price of automobiles and many other products using steel. For example, the automatic catcher and roller tables developed a few years ago have increased vastly the production of the two-high sheet mill. Formerly, as sheets were being rolled, at every pass men caught them and thrust them back into the rolls again, a slow, expensive performance. Then came the continuous wide-strip mill, which poured out rolls of wide steel strip as a paper mill pours out paper. To this the sheet mill has made response: To catch and return the sheets there is a motor-driven sheet catcher controlled by an electric eye. It is quick work—its 2-horsepower alternating current motor reverses 40 times a minute.

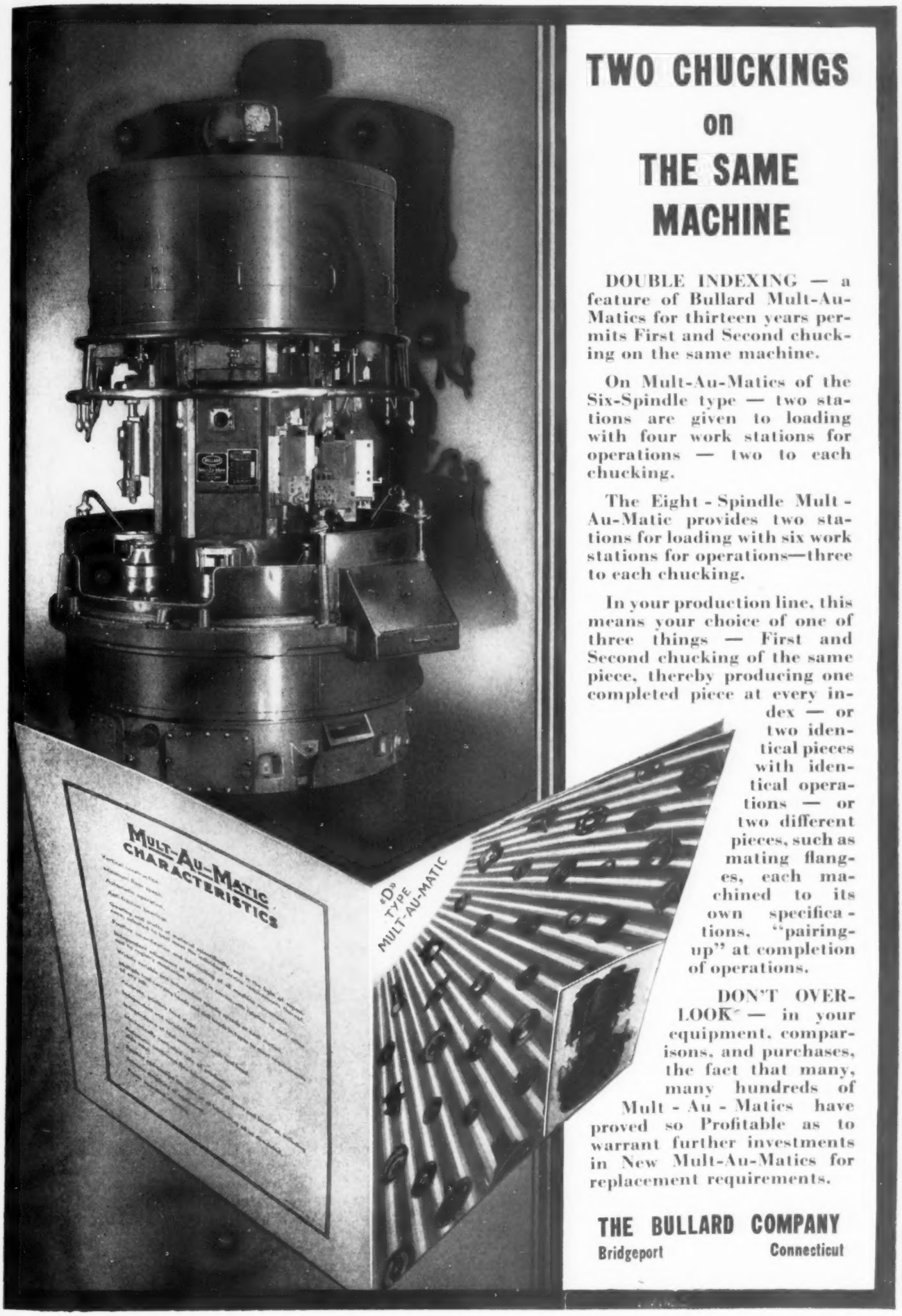
Our engineers have not only promoted modernization by more efficacious electrical devices but have produced many money-saving mechanical improvements such as Micarta bearings, gearmotors and others.

Better Bearings Available

It is hardly possible to imagine more severe service for bearings than on the rolls of steel mills—hot, heavily-loaded, under violent shocks, open to grit and scale, and splashed with dirty water. Under these conditions, bearings sometimes fail in a week. Bearings of Micarta are lasting longer than the metallic bearings they replace and are saving materially in power costs.

The desire for wider and longer sheets with good finish, particularly by the automotive industry, has stimulated the installation of numerous rolling mills both of the single stand reversible type and the continuous type for the production of wide strip steel.

The power required to drive the continuous mills is enormous, 35,000 to 40,000 horsepower concentrated in approximately a dozen main motors being needed for each mill, which can



TWO CHUCKINGS on THE SAME MACHINE

DOUBLE INDEXING — a feature of Bullard Mult-Au-Matics for thirteen years permits First and Second chucking on the same machine.

On Mult-Au-Matics of the Six-Spindle type — two stations are given to loading with four work stations for operations — two to each chucking.

The Eight-Spindle Mult-Au-Matic provides two stations for loading with six work stations for operations—three to each chucking.

In your production line, this means your choice of one of three things — First and Second chucking of the same piece, thereby producing one completed piece at every index — or two identical pieces with identical operations — or two different pieces, such as mating flanges, each machined to its own specifications, "pairing-up" at completion of operations.

DON'T OVERLOOK — in your equipment, comparisons, and purchases, the fact that many, many hundreds of Mult-Au-Matics have proved so Profitable as to warrant further investments in New Mult-Au-Matics for replacement requirements.

THE BULLARD COMPANY
Bridgeport Connecticut

produce sheets 60 to 100 inches wide at the rate of 1600 to 2000 feet per minute. The auxiliaries serving each mill will require, 25 to 30 per cent additional power in smaller motors.

Successful operation of these mills is possible only by electrical means, using apparatus and control developed for the particular purpose after exhaustive engineering studies by the electrical manufacturers in cooperation with the mill equipment builders. The co-ordination of operations of the different stands of the mills requires exact functioning of the control equipment and correlated design of the driving apparatus. Further, the cold rolling finishing mills and numerous auxiliaries such as flying shears, various reels, trimming, cleaning and welding lines require the exact operation only possible by electrical means and are practically automatic in operation.

Obsolescence Is Great

In the metalworking industry also machinery electrification is increasing in importance. The tendency today, particularly in small and medium sized plants, is toward the purchase of machines complete with electrical equipment. And, in addition, new applications are continually being developed for motor drive.

The obsolescence factor of machinery in use has reached an all-time high. It is estimated, due to improvements in design, over 60 per cent of the machinery in use today can be replaced economically. It is reported that 65 per cent of our metalworking machinery is past the old age mark of 10 years.

The recent Machinery and Allied Products institute report shows $18,500,000,000 worth of equipment needed by industry. At an average net saving of only 10 per cent by new equipment, the cost per year of obsolete equipment is nearly $2,000,000,000.

With improved business, plants are already tooling up again. Orders for new machines are better than at any time since 1929. Executives are listening to their own plant operating men and to machinery representatives who are demonstrating how to escape this tremendous obsolescence tax.

Since 1906, when the Westinghouse company supplied the first electrical equipment for reversing rolling mill drive, there has been a steady advance in the use of electrical apparatus in making of steel and for machinery electrification. In this advance there have been three contributing forces—the steel mill engineers, machinery manufacturers and the electrical manufacturers.

Manufacturers Should Not Overlook Investment Feature of New Tools

BY O. B. ILES
President International Machine Tool Co.
Indianapolis, Ind.

MOST manufacturers, particularly those in the heavy industries, during the past five years have been compelled to look to their costs closely. They have been forced to take advantage of every opportunity for savings. Under present conditions and with the future outlook for taxes, labor, material and every other item entering into manufactured product increasing, it behooves every man responsible for a manufacturing business to scan closely his costs to determine where even small savings can be made.

Reason dictates that one of the first places he must look is to his manufacturing equipment, particularly to see that his machine tools are modern if he is a user of machine tools. There has been more progress in the design and quality in machine tools in the last few years than in most lines of equipment. These improvements were caused by demands for better machines; machines that would produce more, not only in quantity, but in quality. The machine tool designer was alert to meet this demand and has produced machines that cannot be overlooked from their quality and quantity production standpoint.

Investment Possibilities

Why is it that the investment in the modern machine tool is not taken into consideration more at the present time? Is it because the user does not know what returns are possible from investments in modern machine tools? Shop men know the advantages of a modern tool and are anxious to take advantage of them.

We have known many men responsible for granting of money for new equipment who were perfectly willing to invest money in stocks and bonds where the return is a small fraction of what is possible from investing this same money in modern machine tools.

Does the prospective buyer lack the necessary funds? The federal reserve system has an attractive proposal for those desiring to invest in modern equipment. Money borrowed at 6 per cent and invested to produce 25, 50, 100 or more per cent is a good way to get dividends for stockholders.

We know of actual experiences where a shop investing in a modern up-to-date heavy-duty turret lathe has been able to produce the parts two, three or five times as fast as formerly with the equipment he had. This is based on the labor and overhead of machining time only. These shops have made enough from savings alone on the initial machining time to pay for the original cost of the machine and equipment in a year or less time.

Machine tool engineers and the engineers of the steel companies have been producing new materials much better adapted to the purpose than ever before. The machine tool men are including these materials in the make-up of the new tools. The makers of cutting steels have been producing new alloys for cutting these new and harder materials much faster and much better. This naturally requires a machine that is stronger, that can take care of higher speeds and greater cutting capacities than have ever been known in cutting metals. It takes a modern machine tool to handle these new features, on an economical basis.

Indirect Savings

The time saved in machining the piece itself is not all the savings. There are indirect savings which, taken as a whole amount to a considerable sum in the course of a year. For instance, take the power necessary to drive a machine tool. The modern machine tool engineer has arranged his machine so that it is motor driven with the motor either directly connected to the driveshaft or connected to the driveshaft by short belt. There are shops still in existence which drive machines from lineshafts and countershafts and numerous belts. It costs money to operate a long lineshaft and countershafts, particularly where there are old types of belting and oiling devices.

The modern machine tool engineer has provided headstock spindles and shafts with ball and roller bearings. The same is true with the aprons and other parts. He has also provided the machine with automatic lubrication frequently from central reservoirs, instead of oiling and greasing the

(*Please turn to Page* 149)

Each Bar . . . . .

INDIVIDUALLY COLD TREATED UNDER ACCURATE CONTROL

• Individual cold treatment of steel bars at the Union Drawn Mills develops radical improvements in their characteristics and offers the widest latitude for selective processing. It permits accurate control of each unit in production and promotes the most dependable practice of inspection. Methods of processing each order are carefully recorded so that identical operations may be performed on future duplicate requirements. The highest uniformity is therefore attained, bar after bar and shipment after shipment.

Union Cold Drawn Steel is steel refined for cost saving and quality improving purposes. Bars are true to required analysis and physical properties, accurate to size and shape, surfaced to the smoothness of a machined finish and carefully straightened. Their working strength has been increased by 70% to 100% and their machinability improved by 15% to 25%. They are ready for production into steel parts with a minimum of machining and the greatest assurance of accurate qualities in the finished work.

It is because of these exceptional features that Union Cold Drawn Carbon and Alloy Steels are so widely used in place of other metals and of steels in other forms.

COLD DRAWING
PROVIDES
MAXIMUM MACHINABILITY

UNION DRAWN STEEL CO. MASSILLON, OHIO

SUBSIDIARY OF
REPUBLIC STEEL CORPORATION

Union Cold Drawn ALLOY STEELS

• These bars have filled special needs for product improvement since the days when alloy steels were first introduced. Today, they are widely used for parts requiring exceptional strength and toughness or high resistance to shock or fatigue in combination with reduced size and weight.

Union Drawn's scientific cold treatments produce these steels in their most economical form. Bars are accurate to size and cross section, are surfaced to machined smoothness and are processed by advanced methods to produce better machining qualities. They are true to analysis, individually processed and carefully inspected — ready to be manufactured into parts with the minimum of operations.

The choice of alloy steels depends upon the nature of the part to be made and the requirements of its application. Our extensive experience with such questions enables us to analyze your needs and give sound recommendations on the proper grade and treatment for the most economical program. Union Drawn's Field Metallurgical Staff has made notable contributions to industry in that direction.

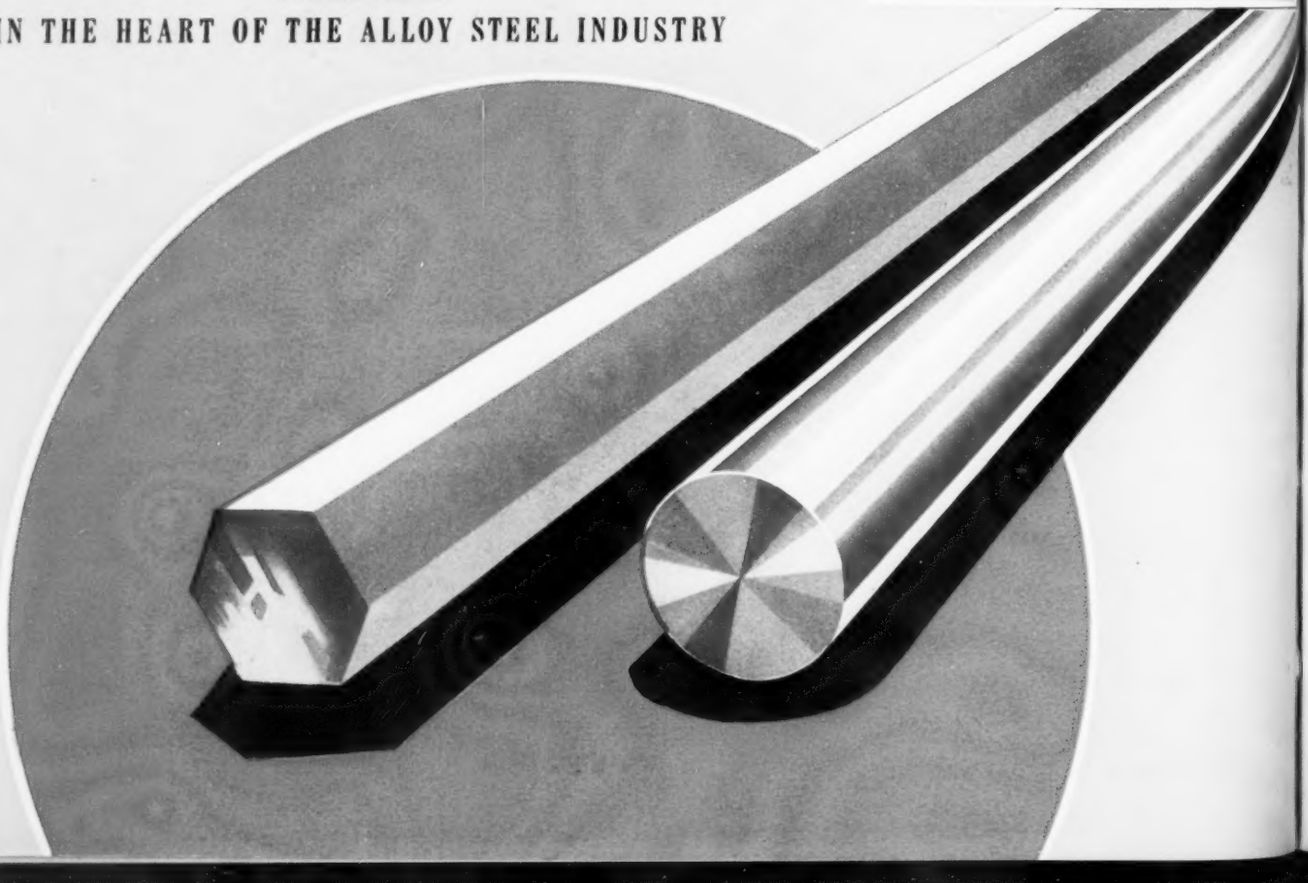
OPEN HEARTH OR ELECTRIC FURNACE

Manganese Steels
Nickel Steels
Nickel-Chromium Steels
Chromium-Molybdenum Steels
Nickel-Molybdenum Steels
Chromium-Nickel-Molybdenum Steels
Chromium Steels
Chromium-Vanadium Steels
Tungsten Steels
Silicon-Manganese Steels
Enduro Stainless Steels

UNION DRAWN STEEL CO. MASSILLON, OHIO

SUBSIDIARY OF
REPUBLIC STEEL CORPORATION

IN THE HEART OF THE ALLOY STEEL INDUSTRY



"Look to the Foreman"

(*Concluded from Page 52*)

direct orders. This does not mean, of course, that various persons may not give him information, instruction or suggestions, but there should be only one person to give him orders. This relates not only to his materials, but also to his tools, quality, costs and safety work. Each foreman should know exactly what he is expected to do and how he may properly represent his men in their relations with higher executives.

We must have foremen who understand their jobs thoroughly, so that when they fire a man, there are sound reasons underlying the action, and the man must "stay" fired. We must have foremen who will tell him why he is fired and state the cause specifically, without any favoritism entering into the transaction in any form.

We, in General Motors, are pleased with the reduction in accidents which foremen have accomplished for us this year. Naturally, we have charts and tables which show the reduction in severity and frequency and lost time, but what is important to me is the reduction in suffering, the reduction in fingers lost and the reduction in hands and eyes lost. Nobody can bring about the elimination of these unfortunate and avoidable accidents as quickly and as thoroughly as foremen. Both we and our employes must look to foremen for suggestions to improve safety, to reduce accidents and to provide suitable working conditions.

Fosters Employe Training

This brings up the matter of instruction and training of employes. Here again we must look to the foreman. Without properly trained employes he cannot get the quality and quantity for which he is responsible; he cannot get the elimination of accidents for which he must be held responsible; he cannot hold within reasonable limits the cost of tools, up-keep of equipment, and manufacturing defects. It is the foreman who must foster and develop mechanical skill and pride in quality on the part of his men.

We must sooner or later look for the next crop of superintendents, production managers, plant managers and general managers, when the present crop is harvested. What more fitting and natural place to look than to our foremen? If foremen are made to realize their responsibilities and opportunities, it is hoped that many of them will train themselves to become better executives, so that when we want them for general charge, we will have a sufficient supply from which to draw.

But with these new trends in foremanship, with more men to train, with greater variety of products and processes, it becomes increasingly necessary for the foreman to know not only his particular part of it, but the whole job. Therefore, it is not enough to rely upon foremen to train themselves. We must also recognize that foremen look to their superiors for a certain amount of leadership and training. The more the foreman knows, the better he will do his job, and the more help he will be. While the production department must depend upon the skill of the engineers to develop products which the public will buy, and be satisfied with, the major part of the problem today is that it be manufactured well.

Fund of Practical Experience

I think that we can never have too little contact with foremen in the rush for the so-called scientific management, which is mostly centralization of all departmental functions. We are apt to forget that what is theoretically possible might be expensive in practice, and that in a good foreman you have a large fund of just this practical experience.

Somebody has said that today a foreman has capital on one side and labor on the other, and that the foreman is in the middle. As earnestly as I know how, I would like to tell you that the foreman is not in the middle as far as my company is concerned. If he isn't out in front, we are going to help him to get there, because that is what his name implies and that is where he certainly belongs.

Essential Part of Company

A man is a foreman because he stood out from other men and was selected; he did not nominate himself. With due respect for a minimum of errors in his selection, he must be said to be a better man. He is, when treated right, the largest collective force for loyalty to the company in any shop. He is generally a high-grade individual and citizen. He is, when taken into your confidence, a conscientious, loyal and practical medium for carrying out the policies of any company. A company which wants to prosper can well afford to give serious thought and discussion to the matter of how to establish the foreman's authority, how to keep him informed of what is required, and what is coming; how to treat him right and help him treat his men right; how to give him a fair chance for promotion to a higher position; how to give him proper leeway to develop men for his job, and other better jobs in the plant; and finally, how to make him feel that he is one of the most important links in the management of the plant.

Survey Reveals Effectiveness and Increasing Use of Carbide Tools

ON CAST iron the percentages of increase in production obtained through the use of cemented carbide tools run all the way from 10 to 200 per cent, the average being about 60. On steel the average is about 35 per cent. These facts were brought out in a progress report presented by Roger D. Prosser, member of the firm of Thomas Prosser & Son, New York, at a meeting held Sept. 12 under the direction of the machine shop practice division, American Society of Mechanical Engineers, in connection with the Machine Tool congress in Cleveland.

Data given by Mr. Prosser revealed impressive progress in the use of cemented carbide and other modern cutting materials. The questionnaire by which the information has been obtained was distributed in April of this year. There are 72 firms using cemented carbide tools. The percentages of use of cemented carbide to all tools used varied over a range up to 100 per cent, as compared with a maximum of 48 per cent in the previous questionnaire distributed in 1931. Average percentage of use, taking into consideration all the 90 usable replies, whether cemented carbide was employed or not, was 8.3 per cent. This compares with 5.2 per cent shown by the 1931 survey (over 60 per cent increase) and less than 1 per cent shown by the first survey in 1930.

If those not using the cemented carbides at all for one reason or another are eliminated, the percentage of use is 10.4 per cent as compared with 7.1 per cent shown by the 1931 questionnaire. This appears to be a very substantial increase, considering that it occurred during the worst of the depression, Mr. Prosser said.

The report further brought out that the use of cemented carbides is

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Steel Engineers To Convene in Pittsburgh

A BUSY three days are in store for members of the Association of Iron and Steel Electrical Engineers who convene at the William Penn hotel, Pittsburgh, Sept. 24-26, for the organization's thirty-first annual convention and sixteenth exposition.

Twenty-nine technical papers are scheduled for seven sessions sponsored by the association's combustion, mechanical, lubrication and welding engineering divisions. General sessions will be held Tuesday morning and afternoon and Wednesday morning. Two sessions are arranged for Thursday morning, one sponsored by the combustion engineering division and the other by the mechanical and lubrication engineering division. During the afternoon, separate sessions will be conducted by the welding engineering and combustion engineering divisions.

Will Present Addresses

Two special addresses have been arranged. Arthur H. Young, United States Steel Corp., will speak on "Industrial Relations," and Col. Horatio B. Hackett, public works administration, on "Absorption of Steel in Federal Projects."

Members of the association and their guests will go to Weirton, W. Va., Wednesday afternoon to visit the plant of the Weirton Steel Co. Social features of the three-day program are the exhibitor's informal dance on Tuesday evening and a formal reception on Thursday evening.

Reflecting somewhat improved industrial conditions, the exposition to be held in the exhibition hall of the William Penn hotel, will include

Program for Iron and Steel Engineers Convention

Tuesday, Sept. 24

9:30 A.M.—William Penn Italian Room

"Developments in the Iron and Steel Industry, 1934-1935," by W. H. Burr, electrical and mechanical superintendent, Lukens Steel Co., Coatesville, Pa.
"A Review of Sheet, Tin and Strip Mills," by Stephen Badlam, consulting engineer, Pittsburgh.
"Run-Out Table Motors and Generators for Hot Strip Mills," by G. A. Caldwell and S. F. Henderson, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; W. B. Snyder, industrial engineering department, General Electric Co., Schenectady, N. Y., and L. E. Hildebrand, General Electric Co., Lynn, Mass.

1:15 P.M.—William Penn Main Ballroom

"Industrial Relations," by Arthur H. Young, vice president, United States Steel Corp., New York.
"Material Handling in the Iron and Steel Industry," by G. N. Harmon, electrical superintendent, Republic Steel Corp., Warren district, Warren, O.
"Power Requirements and Other Factors Pertaining to Rolling Hot and Cold Steel," by E. Kieft, engineer of tests, Illinois Steel Co., Gary, Ind.

7:30 P.M.—William Penn Exhibition Hall

National officers, national engineering committees, members and guests will visit Iron and Steel exposition.

10:00 P.M.—William Penn Ballroom

Exhibitors informal dance.

Wednesday, Sept. 25

9:15 A.M.—William Penn Italian Room

"Processing of Steel in the Finishing Departments," by R. J. Wean, president, Wean Engineering Co., Warren, O.
"Flat Rolling of Steel," by C. L. McGranahan, superintendent 76-inch hot strip mill, Inland Steel Co., Indiana Harbor, Ind.
"Manufacture and Use of Iron and Steel Rolls in Carbon and Alloys," by S. H. Griffiths and J. L. Campbell, Ohio Steel Foundry Co., Lima, O.
"Lubricants for Cold Rolling Strip Steel," by Dr. R. W. Moore, physicist, and E. S. Reynolds, sales engineer, Socony Vacuum Oil Co., New York.

1:15 P.M.—Try Street Railroad Station

Inspection trip to Weirton Steel Co., Weirton, W. Va.

Thursday, Sept. 26

9:15 A.M.—William Penn Blue Room

Mechanical and Lubrication Engineering Divisions

"Composition Bearings for Roll Necks and Other Purposes," by H. M. Richardson, application engineer, plastics department, General Electric Co., Lynn, Mass.
"Progress in the Use of Composition Bearings," by K. T. MacGill, manager, Glyco-Ryertex division, Joseph T. Ryerson & Son Inc., Chicago.
"Composition Bearings," by H. F. Horn, engineering department, Westinghouse Electric & Mfg. Co., Trafford City, Pa.
"Oil Flooded Bearings for Roll Necks," by J. H. Hitchcock, engineer, Morgan Construction Co., Worcester, Mass.
"Development of Specifications for Lubricants," by O. L. Maag, lubrication engineer, Timken Steel & Tube Co., Canton O.
"Cutting Oils," by W. H. Oldacre, director of research, D. A. Stuart & Co. Ltd., Chicago.

9:30 A.M.—William Penn Cardinal Room

Combustion Engineering Division

"Insulation of Open-Hearth Furnaces," by Gilbert Soler, manager of research, Timken Steel & Tube Co., Canton, O.
"The Venturi Port," by George L. Danforth Jr., president, Open Hearth Combustion Co., Chicago.
"Pouring of Molten Steel," by J. P. Walters, open hearth superintendent, and Dr. E. G. Hill, director of research, Lukens Steel Co., Coatesville, Pa.
"Roof Temperature Control of Open-Hearth Furnaces," by M. J. Bradley, engineer, Leeds & Northrup Co., Philadelphia.

1:15 P.M.—William Penn Main Ballroom

All Divisions

"Absorption of Steel in Federal Projects," by Col. Horatio B. Hackett, assistant administrator, public works administration, department of the interior, Washington.

2:00 P.M.—William Penn Main Ballroom

Welding Engineering Division

"Developments in Welding in 1934-35," by Grover A. Hughes, electrical engineer, Truscon Steel Co., Youngstown, O.
"Alternating Current Arc Welding," by W. W. Reddie, industrial department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and E. Steinert, transformer engineering department, Westinghouse Electric & Mfg. Co., Sharon, Pa.
"Welding in the Steel Industry," by E. W. P. Smith, consulting engineer, Lincoln Electric Co., Cleveland.
"Welding with the Alternating-Current Arc," by H. A. Winne, industrial engineering department, General Electric Co., Schenectady, N. Y.
"Developments in the Use of the Oxy-acetylene Process in the Iron and Steel Industry," by E. J. W. Egger, resident engineer, Linde Air Products Co., Pittsburgh.

2:00 P.M.—William Penn Cardinal Room

Combustion Engineering Division

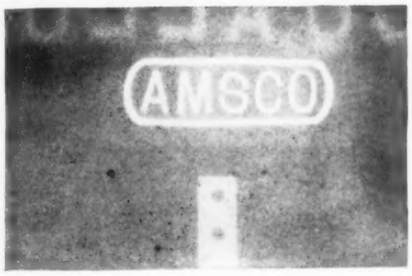
"Some Applications of Controlled Atmosphere to Heating of Steel," by T. B. Bechtel, engineer, Electric Furnace Co., Salem, O.
"Recent Developments in Bright Annealing of Sheets and Strip in Electric Furnaces," by A. N. Otis, industrial engineering department, General Electric Co., Schenectady, N. Y.
"Normalizing Furnaces," by W. E. Blythe, district manager, Driver-Harris Co., Detroit.

10:00 P.M.—William Penn Main Ballroom

Formal reception.

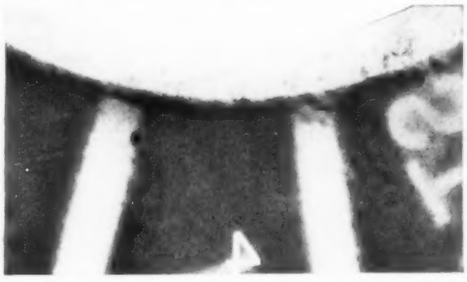
X-RAYED — for your Protection!

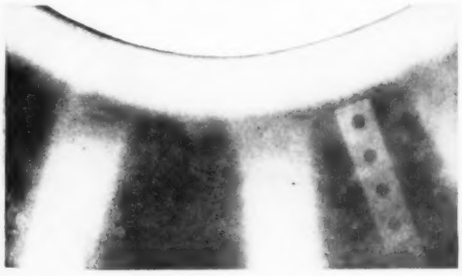
Above. The X-ray equipment used at the AMSCO Chicago Heights plant of 400,000 volts is the largest and most modern in foundry use anywhere!



Above. Radiograph of a used AMSCO Alloy F-3 lead melting pot, showing porosity of metal and consequent lead infiltration as represented by white areas.

F-3 AMSCO Alloy lead pot made from the same pattern after improvement in solidity made possible by X-ray examination.





Extensive shrinkage on the edge of an AMSCO Manganese Steel magnet cover plate, represented by clouded area shown above. At left is another casting from the same pattern showing soundness throughout—made possible by X-ray inspection.

A fifth step, X-ray examination, has been added to our manufacturing procedure which has always included close analysis control, careful foundry practice, accurate heat treatment when desirable, and external inspection of castings. Now X-ray inspection is applied for your protection to typical or pilot castings to improve design and foundry practice.

No longer are we limited to external examination, the microscope or destructive testing. We virtually can "look into" typical castings to identify definitely all internal defects, whether inclusions, blows, shrinks, cracks or porosity. AMSCO Alloy castings are continuously improved by the use of this new scientific tool.

Employ AMSCO Heat and Corrosion Resistant Castings for longest life and economy and freedom from break-down worries.

AMSCO Alloy resists corrosion, and temperatures up to 2100°F., and when correctly applied, does not burn, crack, bend, warp or scale. It is made in a series of chromium-nickel and iron combinations to meet varying applications and has been proved by ten years of use in thousands of applications. It is successfully applied to corrosion resistant applications such as handling acids, gases, salts and mine water, and in heat resistant applications in kilns, furnaces, stills and ovens.

Let AMSCO engineers help you in designing new parts and applying AMSCO Alloy to standard designs to secure a maximum service life. Specify AMSCO Alloy on every cast part requiring complete heat, corrosion and abrasion resistance!

AMERICAN MANGANESE STEEL COMPANY

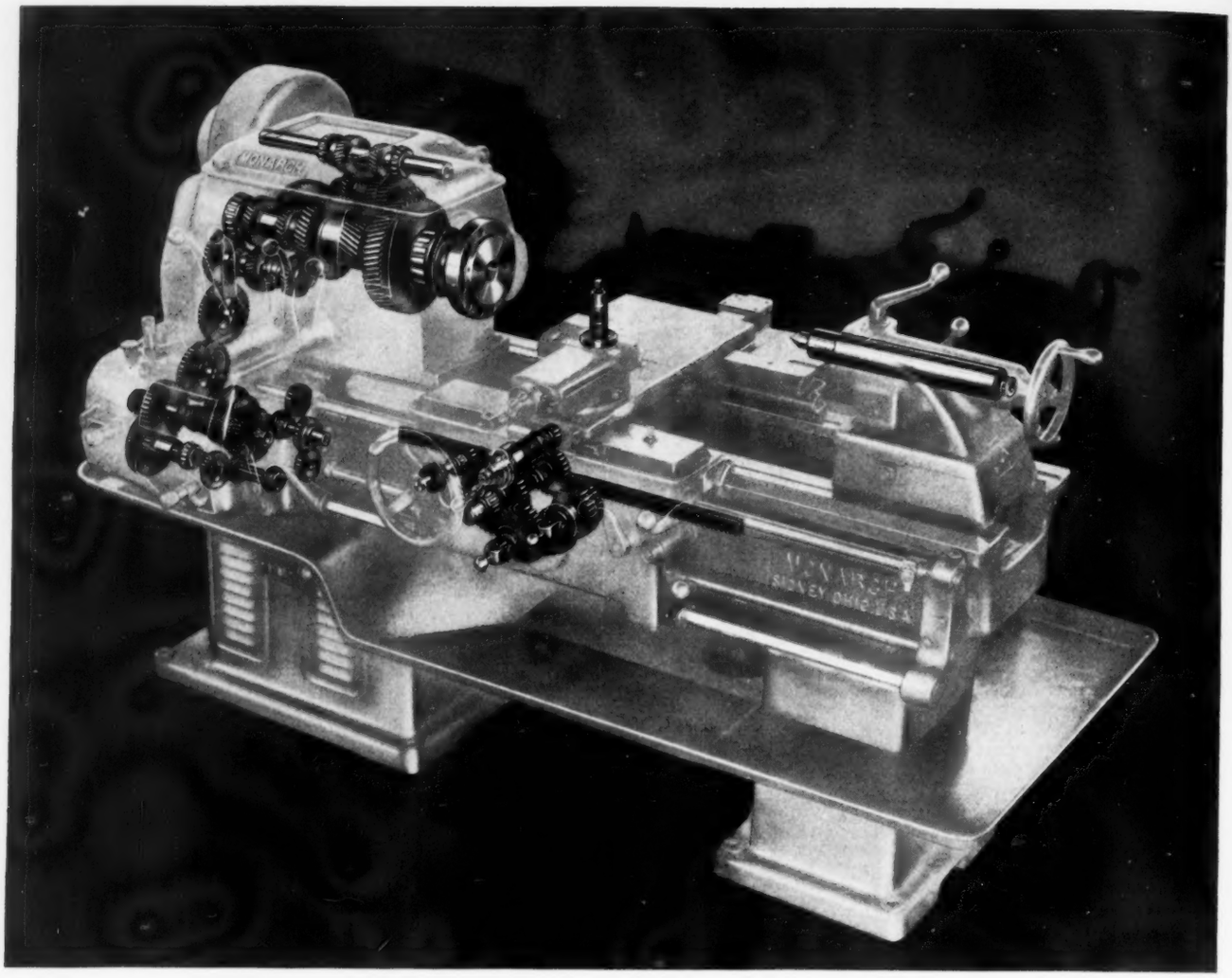
Division of American Brake Shoe & Foundry Company

378 East 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

AMSCO

TRADE MARK REGISTERED



Now... Monarch Offers "All HEAT-TREATED" Steel Lathes

MONARCH engineers have long discussed the outstanding advantages of lathes whose parts were heat treated. They knew that heat treated parts lasted longer and retained their original accuracy over a longer period of time than if they were made of any kind of unhardened or soft steel.

Recently, in line with Monarch's policy of constantly applying the latest engineering practice to the improvement of Monarch lathes, a new All-Electric Heat Treating Department was installed to scientifically harden most of the steel parts used in all sizes of Monarch lathes.

Every part of Monarch lathes is heat treated wherever hardened alloy steel would improve quality, make for greater accuracy and result in longer life. The heat treated steel parts of Monarch lathes include headstock and tailstock spindles, headstock, quick-change gear box and apron gears, shafts, studs, bed rack and pinion. As a result of hardening parts like these, Monarch lathes are now known as the "All Heat Treated Steel" lathes.

The Monarch Machine Tool Co., Sidney, Ohio, U. S. A.

New York Sales Office: 413 Graybar Building

Monarch lathes
Helical Gears - Timken Bearings
SMOOTHER...QUIETER...MORE POWERFUL

Chicago Sales Office: 622 W. Washington Blvd.

about 120 exhibitors, or about 25 more than in Cleveland last year. These manufacturers will exhibit a wide range of steel mill equipment, accessories and supplies. The exposition will be open from 1:30 to 5:30 p.m. and 7 to 10 p.m. on Tuesday; and 10 a.m. to 10 p.m. on Wednesday and Thursday.

Officers Recently Elected

New officers of the association were elected recently and they assumed their posts Aug. 1. They are as follows: President, G. R. Carroll, electrical superintendent, Jones & Laughlin Steel Corp., Aliquippa, Pa.; first vice president, F. W. Cramer, superintendent of electrical construction, Republic Steel Corp., Youngstown, O.; second vice president, J. A. Clauss, chief engineer, Great Lakes Steel Corp., Ecorse, Mich.; director at large, C. A. Kral, assistant general manager, Wheeling Steel Corp., Steubenville, O.; honorary director, J. Farrington, electrical superintendent, Wheeling Steel Co., Steubenville, O.; honorary director, E. Friedlander, Pittsburgh; past president, W. H. Burr, electrical and mechanical superintendent, Lukens Steel Co., Coatesville, Pa.; past president, W. E. Miller, electrical and mechanical superintendent, Bethlehem Steel Co., Johnstown, Pa.; treasurer, C. H. Hunt, assistant to president, Weirton Steel Co., Weirton, W. Va.; secretary, J. L. Miller, assistant chief engineer, Carnegie Steel Co., Youngstown, O.

G. R. Carroll

President, Association of Iron and Steel Electrical Engineers

Serve as Directors

Directors include C. J. Smith, superintendent of auxiliary departments, Illinois Steel Co., South Chicago, Ill.; H. G. R. Bennett, assistant general superintendent, Carnegie Steel Co., Duquesne, Pa.; Stanley Grand-Girard, mechanical and electrical superintendent, Sharon Steel Hoop Co., Sharon, Pa.; C. R. Tinsley, electrical and mechanical superintendent, United States Pipe & Foundry Co., Bessemer, Ala.; M. J. Conway, fuel engineer, Lukens Steel Co., Coatesville, Pa.; C. C. Pecu, lubrication engineer, Bethlehem Steel Co., Lackawanna, N. Y.; C. C. Wales, chief engineer, Otis Steel Co., Cleveland; L. F. Coffin, superintendent of mechanical department, Bethlehem Steel Co., Sparrows Point, Md.; J. A. Voss, manager, industrial relations, Republic Steel Corp., Youngstown, O.

T. B. Little, Empire building, Pittsburgh, is acting managing director.

Exhibitors in Iron and Steel Exposition

William Penn Hotel, Pittsburgh, Sept. 24-26

Exposition Hours

Tuesday—1:30 to 5:30 p.m. 7 to 10 p.m. Wednesday—10 a.m. to 10 p.m. Thursday—10 a.m. to 10 p.m.

Booth No.

A

Alliance Machine Co., Alliance, O. 42
Allis-Chalmers Mfg. Co., Milwaukee 46
Ajax Flexible Coupling Co., Westfield, N. Y. ..... E
Louis Allis Co., Milwaukee 92
Aluminum Co. of America, Pittsburgh 88
American Air Filter Co. Inc., Louisville, Ky. 52
Ampco Metal Inc., Milwaukee ..... D
Amsler-Morton Co., Pittsburgh 84
Atlas Car & Mfg. Co., Cleveland C-103
Automatic Transportation Co., Chicago 41

B

Bailey Meter Co., Cleveland 48
Baker-Raulang Co., Cleveland 80
Bantam Ball Bearing Co., South Bend, Ind 75
Bartlett-Hayward Co., Baltimore 30
Becker Bros. Carbon Co., Chicago A-4
Benjamin Electric Mfg. Co., Desplaines, Ill. 15
H. A. Brassert & Co., Chicago 12
Bristol Co., Waterbury, Conn. 96
Brown Instrument Co., Philadelphia 57
Bussmann Mfg. Co., St. Louis, Mo. 7

C

Clark Controller Co., Cleveland 11
Cleveland Knife & Forge Co., Cleveland ..... E
Colt's Patent Fire Arms Co., Hartford, Conn. 14
Continental Roll & Steel Foundry Co., East Chicago, Ind. A-9
Crescent Insulated Wire & Cable Co., Trenton, N. J. A-6
Crescent Sales Co., Pittsburgh A-6
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J. 63
Crouse-Hinds Co., Syracuse, N. Y. 33
Cuno Engineering Corp., Meriden, Conn. 95
Cutler-Hammer Inc., Milwaukee 17

D

Joseph Dixon Crucible Co., Jersey City, N. J. 60
Duquesne Light Co., Pittsburgh 19

E

Edison Storage Battery Co., Orange, N. J. 87
Electric Controller & Mfg. Co., Cleveland 34
Electric Service Supplies Co., Philadelphia 73
Electric Storage Battery Co., Philadelphia 72
Elliott Co., Jeannette, Pa. C-105
Elwell-Parker Electric Co., Cleveland 76
Equitable Gas Co., Pittsburgh 85

F

Falk Corp., Milwaukee, Wis. 67
Farval Corp., Cleveland 50
Foote Bros. Gear & Machine Co., Chicago 58
Foxboro Co., Foxboro, Mass. 91

G

Gas Co.'s of Greater Pittsburgh, Pittsburgh 85
Gatke Corp., Chicago A-1
General Electric Co., Schenectady, N. Y. 10
General Electric Supply Corp., Bridgeport, Conn. 90
Graybar Electric Co., New York 82
Great Western Fuse Co., New York 99
J. Guy Griffith Co., Pittsburgh, Pa. ..... E

H

Hagan Corp., Pittsburgh 69
Harris-Green Co., Pittsburgh 92
Hodson Corp., Chicago 83

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Exhibitors in Iron and Steel Exposition (Concluded from p. 75)

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Homestead Valve Mfg. Co., Coraopolis, Pa. 4
Hyatt Roller Bearing Co., Harrison, N. J. 36

I

Ideal Commutator Dresser Co., Sycamore, Ill. 98
Iron and Steel Engineer, Pittsburgh ..... Hall No. 2
I-T-E Circuit Breaker Co., Philadelphia 31
Ivanhoe Division—Miller & Co., Meriden, Conn. 89

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K

W. G. Kerr Co., Pittsburgh 58

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Lapp Insulator Co. Inc., LeRoy, N. Y. C-102
Le Carbone Co. Inc., Boonton, N. J. 59
Line Material Co., South Milwaukee, Wis. 92
Lubrication Products Co., Cleveland 8

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Mackintosh-Hemphill Co., Pittsburgh ..... A
Manufacturers Light & Heat Co., Pittsburgh 85
Martindale Electric Co., Cleveland 55
Mathews Conveyor Co., Ellwood City, Pa. 94
Mercury Mfg. Co., Chicago A-2
Mesta Machine Co., Pittsburgh, Pa. 9
Minneapolis-Honeywell Regulator Co., Minneapolis 57
Morgan Engineering Co., Alliance, O. 5
Morganite Brush Co. Inc., Long Island City, N. Y. 78

N

National Carbon Co. Inc., Cleveland 20
National Electric Coil Co., Columbus, O. 68
National-Erie Corp., Erie, Pa. 47
National Industrial Products Co., Wilkinsburg, Pa. 8
Natural Gas Co.'s of Greater Pittsburgh 85
Nichols-Lintern Co., Cleveland 74
Norma-Hoffmann Bearings Corp., Stamford, Conn. 45

O

Otis Elevator Co., New York 56
Owens-Illinois Glass Co., Toledo, O. 71

Booth No.

P

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Peoples Natural Gas Co., Pittsburgh 85
Philadelphia Gear Works, Philadelphia 63
T. W. Phillips Gas & Oil Co., Butler, Pa. 85
Poole Foundry & Machine Co., Baltimore 44
Pure Carbon Co. Inc., St. Marys, Pa. 62
Pure Oil Co., Chicago C-100
Pyle-National Co., Chicago 79

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Reliance Electric & Engineering Co., Cleveland 1
Cyrus William Rice & Co. Inc., Philadelphia A-3
Robinson & Stanger Co., Pittsburgh 71
Rollway Bearing Co. Inc., Syracuse, N. Y. 49
Rowan Controller Co., Baltimore C-106
Joseph T. Ryerson & Son Inc., Chicago C-101

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S K F Industries Inc., Philadelphia 39
Socony-Vacuum Oil Co. Inc., New York 70
Square D Co., Detroit 66

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Timken Roller Bearing Co., Canton, O. 24
Tool Steel Gear & Pinion Co., Cincinnati 28
Trabon Engineering Corp., Cleveland 64
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Trumbull Electric Mfg. Co., Plainville, Conn. 6
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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. 22
Weston Electrical Instrument Co., Newark, N. J. 54
Daniel Woodhead Co., Chicago A-7

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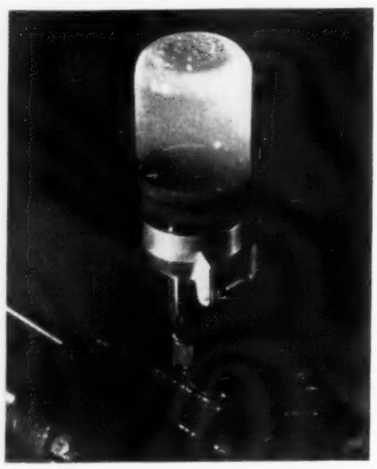
Youngstown Sheet & Tube Co., Youngstown, O. ..... Hall No. 2 Annex

New Plastic Material Is Selected for Oiler Bottle

Transparency of the new plastic known as Tenite admirably adapts it for use as the bottle portion of a new type oiler developed by Gits Bros. Mfg. Co., Chicago, and shown in the accompanying illustration. The application ruled out glass because of its tendency to crack or shatter when subjected to shock and vibration. One of the primary requirements for the fitting was a material which would be practically unbreakable; this cellulose acetate plastic provided the solution.

Consisting of a bottle and stem attached to a hinged metal fitting through which oil is fed to the housing of the bearing, the design of the device permits ready inversion of the bottle for filling. Even if a careless oiler should allow the bottle to strike against the machine the toughness of the plastic prevents breakage. Tennessee Eastmann Corp., Kingsport, Tenn., is the producer of the plastic and developed the fabricating and cementing process by which the bottle is molded in two pieces and cemented together.



Transparency combined with toughness adapt plastic material to use as the bottle for an oiling device

Better Warm Air Heating With Improved Register

A new type of wall register for warm air heating systems has been developed and patented by James W. Bergstrom, president Bergstrom Mfg. Co., Neenah, Wis. The design prevents dead air space in the register head, prevents back drafts through the lower portion of the register opening and assures velocity of warm air, thus putting the entire register to work. The register fits tightly into the register head, preventing air leaks which result in discolored walls.

ONLY STEEL STORAGE BATTERIES HAVE THE STURDY QUALITY OF STEEL!

Industrial storage batteries and battleships should both be built of steel! The advantages of steel construction are parallel in many ways:

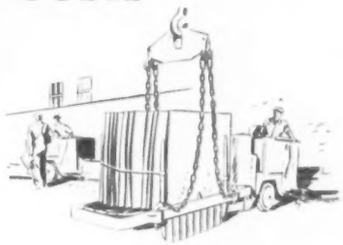
RUGGEDNESS

A storage battery built of steel is strong and substantial, doesn't need nursing, stands up better even under abuse. It is, above all things, dependable.

LONG HEALTHY LIFE

Steel has long life—and so have steel storage batteries. Some have been in continuous service as long as 26 years.

LOW COSTS



For these reasons and because maintenance cost is at rock-bottom, the per-year cost of a steel battery is substantially lower. The extra dependability is a bonus!

●

Only one storage battery of American manufacture uses steel—the Edison; all others use lead. The Edison employs an alkaline electrolyte, which is a preservative of steel; all others employ acid. This advertisement is published to remind men who know steel that steel in a storage battery is as desirable as steel in a sky-scraper. It is worth finding out what heavy-duty storage battery your company uses.

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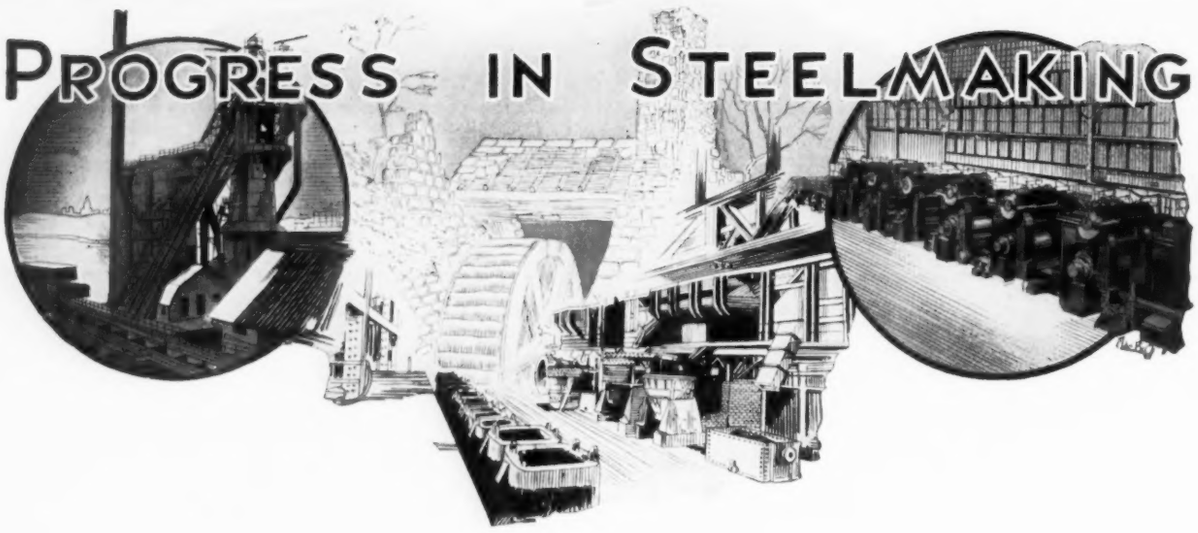
PROGRESS IN STEELMAKING



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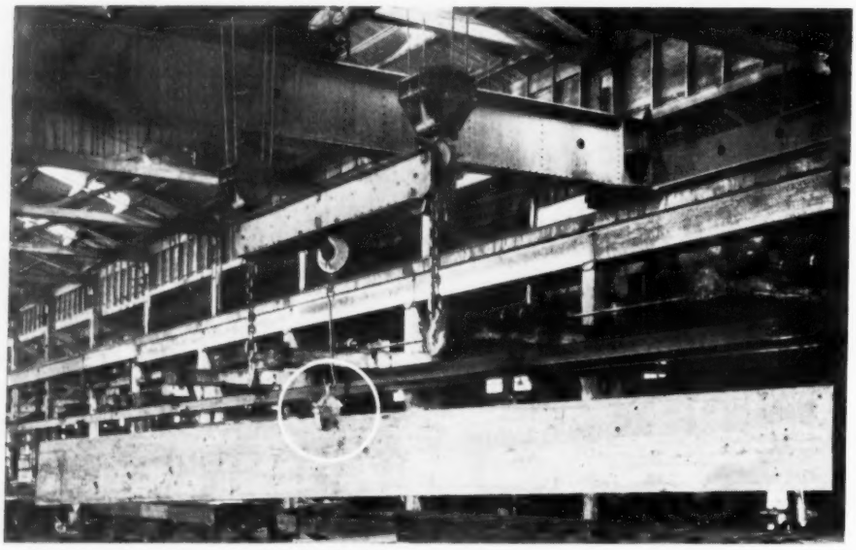
Plain mineral oil is highly satisfactory as a carrier for colloidal graphite when used as a cutting fluid, according to recent tests. The oil by the addition of colloidal graphite becomes a most efficient cutting medium and the steel is left with an excellent finish. The increase in tool life as well as the allowable cutting speed is marked. Best results are obtained by using 0.153 per cent of colloidal graphite by weight in plain mineral oil.

• • •

Ignition System Automatic

Lighting the vertical tube type annealing cover merely by throwing a switch and opening one gas valve has been made possible by the development of a new system of automatic continuous electric ignition and automatic shutoff of fuel. The gas automatically is cut off in case of power failure. The new system greatly reduces the time necessary in changing covers from one box to another; eliminates the possibility of burners not being lighted; and effects a more rapid and uniform annealing. The ignition system is of particular advantage where exhaust systems are connected to the exhaust end of the burner tubes and eliminates the danger of the exhaust system extinguishing the flame.

Device Handles Heavy Materials with Safety



TIME AND LABOR SAVED IN LIFTING MATERIAL—Plates, shapes, columns and structural and fabricated material now can be handled with utmost safety by the use of a recently marketed device. The latter is suspended from a crane by a cable connection through an eye. A lever pulled downward lifts two sliding bars and a roller on the inclined surface so that the full opening of the throat can be placed over the marginal edge of the plate. The lever then is released and the load is held in a grip that cannot be broken or released until the load has been landed and the trip rope pulled. One of the tests to which the device was subjected was to grip a heavy column on its end, raise it in the air by a revolving locomotive crane and rotate the crane until the column had assumed almost a horizontal position. The direction of rotation then was changed without landing the piece and still the grip could not be broken until the load was landed. The lifter was devised by Shaw-Box Crane & Hoist Co. Inc., Muskegon, Mich.

• • •

Prevents Acid Dilution

Heating pickling tanks without diluting the acids has been made possible by the development of an immersion unit which consists of an electric heating element around which a ½-inch layer of lead is cast. The unit is applicable with mild sulphuric acid solutions and chromium plating baths, and withstands ordinary pickling bath temperatures; it can not be used with hydrochloric or hydrofluoric acid solutions.

• • •

Records Power Consumption

Measuring kilovolt amperes with high accuracy has been made possible by the development of a new graphic recording meter. By means of three sets of taps, the instrument is designed to cover a power factor ranging from 0.54 to 0.94 with an error not exceeding 1½ per cent. A tap is provided on the phasing network to permit measurement of reactive volt amperes with the same instrument. The instrument is valuable in studying kilovolt ampere consumption in rolling mills regardless of whether or not billing is done on a kilovolt ampere basis.

Custom-Made Ingot Molds for Quality Steels

MORE than one-eighth of all the steel made during the past six months was cast in Gathmann molds of the big-end-up type.

• These molds are designed to suit the particular steels being produced and for specific plant conditions — custom-made in the truest sense.

• Modern Gathmann molds are the steelmaker's best assurance of uniform quality, plus high yields. Whether the output of the plant is fully-killed, semi-killed or rimming steel, or some of all three, a Gathmann designed mold will insure the best possible product, in surface and interior.

• To the steel user, "produced in Gathmann molds" means sound, dependable ingot product. They have learned from experience that NO STEEL PRODUCT IS SOUNDER THAN THE INGOT FROM WHICH IT IS PRODUCED.

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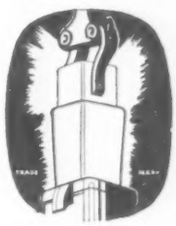
• We invite you to visit our booth, No. C 23, at the Metal Congress in Chicago next month. Our exhibit will include both sound and unsound etched ingots and blooms, also the most modern methods of big-end-up ingot production.



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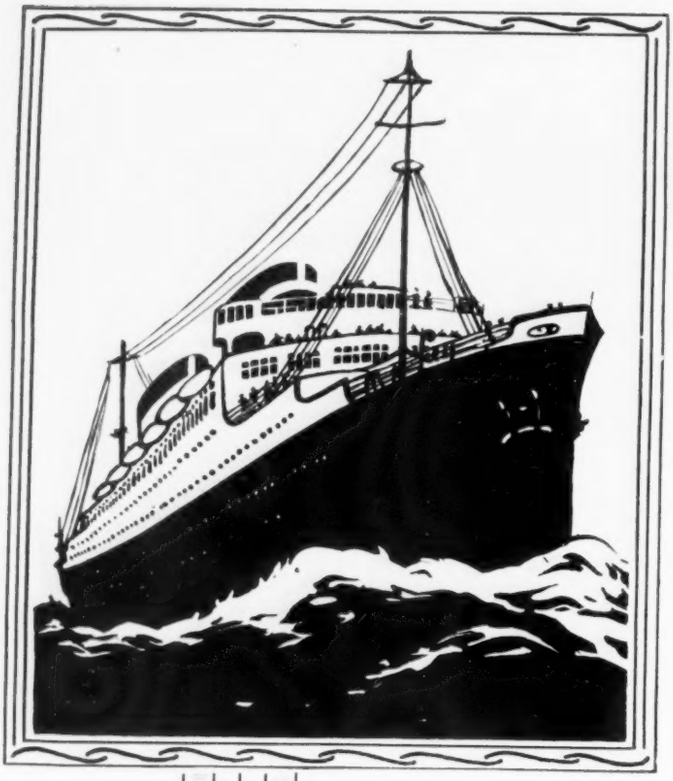

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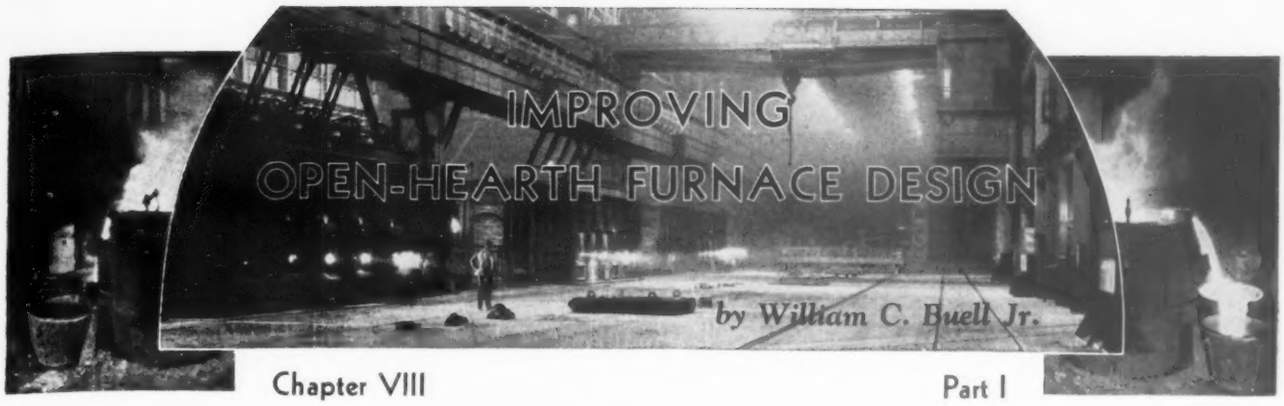

Chapter VIII Part I

Checkerwork for Open-Hearth Furnaces

CHECKERWORK is the primary heat exchange medium of the open-hearth system. It occupies the majority of the volume of the regenerator chambers and consists of a mass of brickwork, loosely laid to a design that agrees with the operators and/or designers ideas of a structure that will effect the greatest and most effective transfer of heat to or from the various fluids passing under the conditions of operation as actually existing.

A secondary heat exchange medium that plays a much greater effect in the results than that with which they usually are credited consists of the wall, roof and bottom surfaces of the downtakes, slag pockets, fantails and connecting flues.

On account of the great number of variables ever present and constantly changing conditions exact technical analysis of the operation of the checkers installed in any given furnace is utterly impossible, and even if such was possible the findings would have no exact application even on the furnace next in line, let alone in another shop. Therefore, discussion, analysis and development of any conditions anent the checkers must proceed along hypothetical lines.

Fouling Affects Operation

As illustrative of a single continually changing phase of checker operation consider the effect of the fouling of the checkerwork which proceeds from the instant a rebuilt furnace is put under heat, and its effect on fuel and production rates. The effect of fouling on these factors is presented in the unusual data of the chart, Fig. 154. From January, 1929, to September, 1931, the increasing fuel and decreasing production rate from the time a rebuilt furnace went into production until it was shut down for a rebuild was calculated for each furnace and campaign in a large plant.

The summated results are shown by the three solid annual lines, and the following description will serve to show how the lines were calculated. In 1929, against a 753,000 gross tons ingot output the average production rate of all rebuilt furnaces for the first month of operation was about 9.33 tons per hour at a fuel rate of about 5,250,000 B.t.u. During the month preceeding the shutting down of a furnace for rebuild the average production and fuel rate of all furnaces shut down in 1929 for that purpose was about 8.65 tons per hour, and more than 6,000,000 B.t.u. of fuel per ton of ingots.

Fuel Requirements Lower

It is interesting to note that with production substantially below the 1929 record peak in 1930, the same approximate tonnage rates were maintained, but with considerably less fuel. Moreover, in the leisurely operations of 1931, during which period the few furnaces under heat were operated by assistant superintendents, turn foremen and melters the good average fuel rate (for producer gas operation) of 1930 was maintained. The low tonnage rates for 1931 may be explained as the results of intermittent operation including many shutdowns, and to the fact that the furnaces were operated long after a general rebuild was needed, on account of the economic conditions.

The dash line, A, represents the campaign of an individual furnace equipped with patented block-type checkers. These were installed in this plant a year or two later. It is interesting to note the fine fuel and tonnage rate at the start of the campaign in April and the constant increase in fuel and decrease in tonnage due to the rapid and considerable fouling of the checkerwork until operation prematurely was suspended in July to allow the replacement of the checkers.

Line B shows the operation of a second installation of patented checkers but of the unit type, made in this plant at the same time as

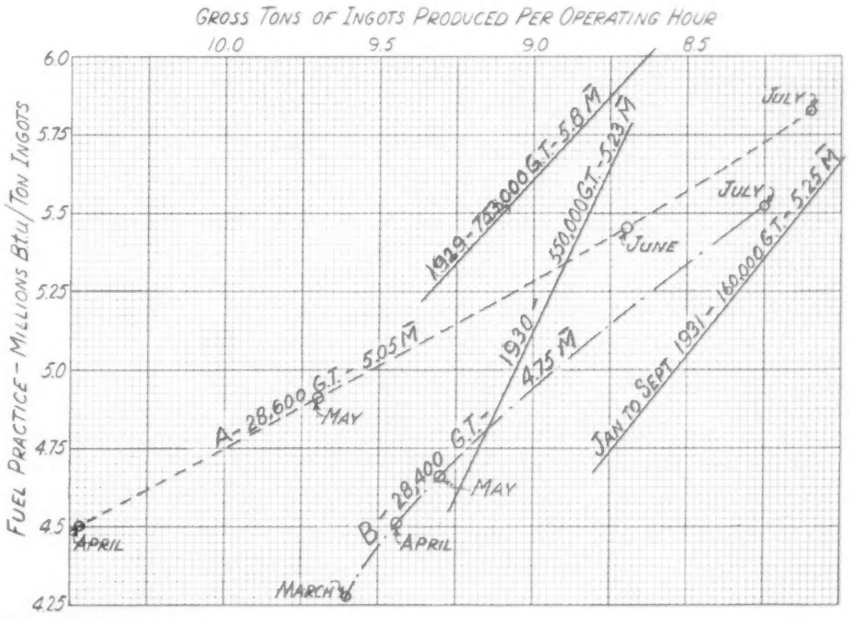

Fig. 154—Chart showing the effect of fouling checkers on production and fuel rate

the previous example. At the start of the campaign the fuel rate was especially fine with the tonnage rate well above the shop average. A severe fouling of the checkers and a considerable reduction of the tonnage, however, rate was responsible for a short campaign although the average fuel rate of 4,750,000 B.t.u. for the total operating period is exceptionally good.

The design of the two principal types of checkerwork, one having vertical flues and the second horizontal flues proceeds along dissimilar lines and consequently will be discussed separately.

The fundamental layout schemes of vertical flue checkerwork are illustrated in Fig. 155. In this the upper are plan views taken above the checkerwork. The blackened areas indicate the clear flue area extending from top to bottom. The lower elevation is a section taken on the center line of any row of flue openings. In these the cross hatched area are bisected brick and the diagonals indicate horizontal cross flues or openings from one flue into the adjoining flue.

Arrangements Are Cited

The open flue design, A, is the most common arrangement and probably one of the best. All brick are of like dimensions, standing on edge.

The B arrangement is similar to the foregoing exception that alternate horizontal courses are laid flat in an effort to secure greater structural stability. The arrangement while slightly increasing surface area and mass, infringes materially on flue area and allows a greater horizontal surface upon which dust may find lodgment.

Arrangement C is arrangement A with the brick staggered. In the lower part of the plan view the brick are staggered in one direction while in the upper part they are staggered in both directions. While the gross flue area is the same in both the A and C arrangement, the clear flue area, e. g. vertically clear from top to bottom, is curtailed, and frictional resistance to draft is much increased.

Obviously, the only purpose from the use of the C design is to increase the turbulent flow of the gases. It is patent that the increased resistance to flow will cause considerable draft loss. It is questionable that this design is either necessary or desirable. Turbulent action of the gases in the checkerwork is the subject of a subsequent discussion.

The conventional chimney flue arrangement is shown in D. The chimney flue presents four plane surfaces without cross openings from top to bottom. On account of several advantages it should find a wider use than at present. The usual design has the disadvantages that one-half of the brick are unsupported as indicated by the letter "L" in the illustration. If 10½ inch square flues are developed from 3-inch thick tile, the supported tile will be 13½ × 3 inches with 10½ × 3-inch unsupported tile. While the unsupported tile seldom become misplaced, the possibility is a factor which may weigh against the use of this type of construction. One way to overcome this objection is by the use of tile with pointed ends, as indicated in E, which permits an absolutely stable construction. In the quantities in which such special tile are used in open-hearth checkers, the manufacturer's "extra" is not large.

Table CXXII

Schedule of Checker Brick in Typical Furnaces

Brick size, inches	Type Fig. 155	Flue Size, Inches square	Regenerator Chambers	
			Air	Gas
a	b	c	d	e
10½ x 4½ x 4½	A	6	I-L-D-E-M	I-L-D-E-M
9 x 4½ x 2½	A	6½	A-K	A-K-N-O
10 x 4½ x 3*	B	7	J	J
10 x 4½ x 3†	C	7½	G	G
10½ x 4½ x 3	A	7½	N-O-B	B
13½ x 4½ x 3	A	10½	H-F	H-F
13½ x 6 x 2½	D	11	P	P
10½ x 6 x 2½				

* Danforth patent design.
† Loftus patent design.

Brick Schedules Are Listed

The checker arrangements as found in the typical furnaces are listed in Table CXXII. The continual use in many furnaces of the outdated 10½ × 4½ × 4½-inch brick likely is attributed to their high mass and reclamation value which often mistakenly is considered to indicate a high order of economy. This is fallacious reasoning for the overall economic cost of these thick brick is higher than thinner brick as will be demonstrated later.

The open-hearth operator likely will select his checker design on any

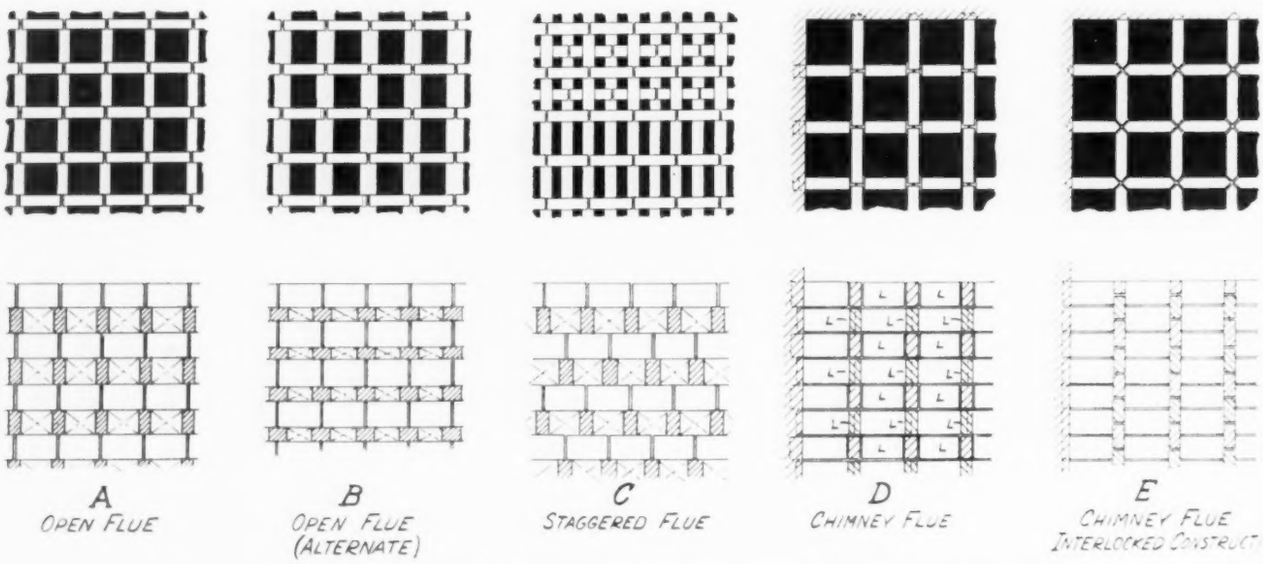

Fig. 155—Design which illustrates the various types of vertical checker flues

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Table CXXIII

Dimensional Properties of Selected Checker Brick

Brick size, inches a	Flue size, inches square b	9-inch std. brick Equiv.* c	Pieces per cu. ft. d	9-inch equiv. per cu. ft. e	Exposed surface Ft.²/Ft.³ f	Free area Ft.²/Ft.² horizontal surface g
OPEN OR STAGGERED FLUE TYPE						
9 x 4½ x 3	6	1.23	4.74	5.83	3.85	0.444
10½ x 4½ x 4½	6	2.15	3.49	7.50	3.60	0.327
9 x 4½ x 2½	6½	1.00	4.74	4.74	3.68	0.522
Patent checker "A"	7	.....	5.23	5.81	5.25	0.370
Patent checker "B"	7½	.....	4.59	7.72	3.65	0.495
10½ x 4½ x 3	7½	1.43	3.49	4.99	3.38	0.510
10½ x 6 x 3	7½	1.92	2.62	5.03	3.11	0.510
10½ x 6 x 2½	8	1.60	2.62	4.19	3.02	0.580
13½ x 4½ x 4½	9	2.77	2.10	5.82	2.95	0.440
13½ x 6 x 3	10½	2.40	1.59	3.82	2.48	0.605
13½ x 6 x 2½	11	2.05	1.59	3.26	2.39	0.664
CHIMNEY FLUE TYPE						
13½ x 6 x 2½	11	1.78	3.18	5.62	2.90	0.664
13½ x 6 x 3	10½	2.14	3.18	6.76	2.77	0.605
15 x 6 x 3	12	2.40	2.56	6.14	2.56	0.640
16 x 6 x 3	13	2.58	2.25	5.18	2.44	0.660
18 x 6 x 3	15	2.94	1.78	5.22	2.22	0.694

*The equivalents of this column are calculated against the 9 x 4½ x 2½ as containing 101.25 in.³

or all of the following factors which will probably rank in importance in the order listed: first, checker flue area both on that of the individual flue unit and on the totalized area available to pass the fluids; second, the transfer surface presented; third, the thickness of the brick either from the viewpoint of stability or mass effect; and fourth, the cost of the checker brick.

As a basis for a discussion of certain of these factors in concrete terms the data of Table CXXIII is introduced. This includes the principal brick shape that find common use as checker brick, two well-known patented forms, as well as other shapes that may be used advantageously.

Depends Upon Flue Dimensions

CHECKER FLUE AREA: The frictional resistance to free fluid flow and the rapidity with which the individual flues will lose area as a result of dust accumulation will be in accordance with the dimensions of the individual checker flues, while the average velocities of the gases through the checkerwork will be governed by the totalized area of the checker flues present for the ingress of the fluids. In the subsequent consideration of the fluid flow through the checkerwork the velocity values will be grounded on the assumption that 60 per cent of the total checker flue area is the median area available throughout the campaign of the furnace.

One of the chief factors in favorable regenerator action will be low velocities through the checkerwork, in order to secure the greatest contact time with the surfaces of the exchanging refractories. This will be secured through effective distribution of the fluids over and below the checkerwork and a considerable horizontal area of checkerwork within a regenerator as well as a large proportionate free area for the entrance of the fluid into the checker flues.

Table CXXIV

Relative Fluid Velocities Through Checkerwork

Furnace	Relative Velocity—Ft./sec. as at 32° in air regenerator furnace gases a	air b	in gas regenerator furnace gases c	fuel gas d	Length of fluid travel in checkers, feet e
GROUP A					
A	4.9	3.5	4.9	5.4	13.0
J	5.1	3.7	6.4	7.1	14.0
K	4.1	3.0	4.0	4.4	14.0
N	5.6	4.1	5.2	5.7	17.0
O	6.1	4.5	5.7	6.3	17.0
Proposed	3.7	2.6	3.7	4.3	15.5
GROUP B					
I	4.6	2.4	....	....	16.5
P	2.1	1.4	....	....	16.5
GROUP C					
G	3.4	1.5	....	....	15.0
L	10.5*	10.3*	11.1*	7.6*	37.0*
GROUP D					
B	3.0	2.4	....	....	12.25
D	2.2	2.8	....	....	12.5
E	2.8	3.7	....	....	12.5
H	2.3	1.8	....	....	13.75
F	4.0*	3.0*	....	....	24.0*
M	3.4	2.7	....	....	12.5
Proposed	2.4	1.9	....	....	15.5

*Vertical 3-pass operation.

Flow Values Are Tabulated

Relative flow values as found in the checkerwork of the typical and proposed regenerator chambers are given in Table CXXIV.

These values are determined from equation (52) which is as follows:

$$\text{Relative velocity as at } 32^\circ = \frac{\text{Vol} \times \text{K}}{\text{A} \times \text{a} \times \text{c}} \quad \ldots\ldots\ldots\ldots (52)$$

In the above,

Vol = Volume of fluid at 32° pass in one second, columns g, h and i, Table XCII.

K = Coefficient of relative change, at appropriate average temperature, column D, Table LVIII.

A = Area in square feet of checkerwork.

a = Percentage checker flue area in A, column g, Table CXXIII.

c = Factor of effectiveness of checker area or volume to flow, taken at 0.60.

To this point the distribution of the furnace gases to the air and gas regenerator chambers has been computed from the ratio of areas A_a and A_g when firing producer or mixed gas. In accordance with this ratio and assuming similar intensity of draft the volume of furnace gases passing to the gas regenerators has been only about 10 per cent of the volume received by the air regenerators.

Effected by Damper Adjustment

Subsequently, it will be demonstrated that to superheat the producer gas from the temperature of 1250 degrees Fahr. at which it enters the regenerator to 2100 degrees at which, in good operation, it is presumed to leave, will require the use of about 40 per cent of the total furnace gas volume. This condition in the distribution of the fur-

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nace gases will be accomplished by damper adjustment.

As critical consideration of the flow of the fluids in regenerator chambers now will begin, it will be necessary to continue from this point with the flow of the fluids in producer gas practice divided on this ratio. Accordingly, in computing the values of Table CXXIV the volumes of the furnace gases, column i, Table XCII, are divided 60 per cent to flow to the air regenerator and 40 per cent to the gas regenerator of all the group A furnaces and furnace L. In all other cases, the effluent system operates and is solved as a unit and the flow is considered as proportional to the areas at A_{11}.

Temperatures used as a base for determining the coefficient K are the mean temperatures of the particular fluid within the checkerwork. In usual producer gas firing, with box-type checkers, this is assumed as 2050° (2850° + 1250° / 2),* and that of the air as 1225° (1950° + 500° / 2). Appropriate modification is made in certain of the other typical cases.

It will be evident that the velocity values of Table CXXIV for any regenerator may be altered by a change in the checker brick size, and any modification in this direction will alter the velocity directly as the percentage of checker flue area changes, column i, Table XCII.

An idea of the time any of the fluids will be in contact with the checker brick may be gained by dividing the length of fluid flow in the checkerwork by the appropriate velocity value. By inspection it is evident contact time is at most but a few seconds.

Low Velocity Is Desirable

As heat is transferred from the furnace gases to the checkerwork almost entirely by convection and as a function of time among other important factors it will appear that low velocity through single pass checkerwork is a factor to be sought, especially as the larger the checker flue the better its dust cleaning properties. In general operators appear to favor small checker flues in the gas regenerators in preheated fuel practice, somewhat larger checker flues in the air regenerators in the same practice and still larger flues in all other fuel practices. Large checker flues may be beneficial to operation in any practice, and many progressive operators show a preference for the large sizes but because of numerous variables entering into the practice of any particular plant, and the impossibility of securing reliable and convincing data or of universal application, the correct size of checker flues is the moot question of the practice. This condition probably will remain until it can be proved definitely or disproved that under open-hearth conditions, large flues, say 15 x 15 inches, a materially greater differential of temperature between the center portion of the gas stream and its outer surface is possible of maintenance than with a small flue, say 6 x 6 inches. If and when it is proven that little or no substantial difference of temperature can exist in a moving gas column in a checker flue of any reasonable dimension, the small checker flue will pass to discarded practice to the great benefit of furnace operation and economy.

Flues 7½ x 7½ inches or larger in both regenerators for preheated gas operation, and 10½ x 10½ inches or larger for all other methods of firing are preferred. The foregoing flue dimensions are considered as incorporated in the proposed furnaces.

Produces Increased Turbulence

The only reason for advocating the staggered flue type checkerwork, Fig. 155-C is the increase of turbulence in the flow of the fluids within the checkerwork it produces. The installation of this type likely will curtail the apparent checker flue area, increase the draft loss and owing to the greater opportunity offered for dust accumulation, may be responsible for shortened and less efficient campaigns.

As the exposed surface of the checker brick presented is the principal medium through which heat actually is exchanged from hot furnace gas to air or fuel, it follows that an ample surface is one of the prime factors sought in checkerwork design. Surface is generally greater with smaller flue openings and thus the most satisfactory compromise between flue area and surface area must be sought that will best meet the particular conditions encountered. The exposed surface of the chimney flue design is about 20 per cent greater and the brick mass materially more than with the open type. Thus with similar sizes of flues and equal thickness of checker brick the chimney-type checker should be the more effective. Its successful use, however, requires a higher degree of distribution over and below the checkerwork.

(To be continued)

The arithmetic mean temperature as used here is approximately only. The true average temperature is the logarithmic mean which will be used for more exact analysis.

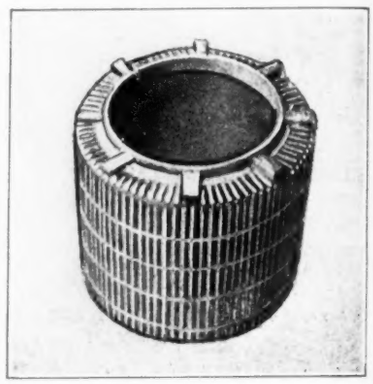
Correction

In the description of the new hydraulically-operated, 6-inch, plunge-cut, semiautomatic grinding machine of the Norton Co., Worcester, Mass., described in STEEL of Sept. 2, page 110, it was stated that when a lever is moved by the operator the work starts rotating, the grinding wheel is fed in rapidly until it contacts the work, "whereupon the grinding wheel speed is reduced and kept at the reduced rate until the workpiece has been ground to the correct size."

The correct wording should have been "the grinding wheel feed is reduced," etc.

Steel Sheets and Tubing Used in Pump Strainers

Two improved pump strainers, recently developed by the Rife Hydraulic Engine Mfg. Co., 75 West street, New York, with plant at Hackettstown, N. J., are of steel. One type, with a companion flange, for use with pumps on permanent locations in lifting water from sumps or reservoirs, is made of 8 or 10-gage steel sheets provided with ¼ x 2-inch slots. The inner tube is of cold drawn steel and is long so as to provide for complete sump drainage and at the same time brace the outer shell. When completed the



Improved pump strainers are built of slotted sheet steel with cold drawn steel inner tubes. That shown is for portable, self-priming pumps

strainers are hot galvanized. Standard sizes range from 5 to 12 inches and weigh 25 to 120 pounds each. Larger sizes, up to 24-inch suction, may be built to order.

The other, shown in the accompanying illustration, is of the spider type flange and is for use with portable, self-priming pumps. Standard sizes, 4-inch and smaller, are of perforated 12-gage steel sheets with 3/16 x 1½-inch slots; they have recessed gaskets and are threaded for use with rubber hose. Larger sizes are of 10-gage sheets with ¼ x 2-inch slots and are threaded for standard tapered pipe. A cold drawn steel inner tube welded to the flange allows complete dewatering of sump or construction pit. These strainers in the 2 to 8-inch sizes weigh from 4 to 27 pounds each.

The Stage is Set!

THE CAST is ready, the stage is set, and it's almost curtain time for the greatest metal show of the year—the National Metal Congress and Exposition. ◆ This important event of the metal world will open Monday, September 30, in the new International Amphitheatre, Chicago. For five full days, thousands of executives, engineers and technicians will be on hand to get abreast of the latest developments in the production, selection, fabrication, inspection, treatment, welding and application of all kinds of metals. They will be there to

SEE . . . the latest materials, methods and equipment in the metal industry displayed at one time and in one place.

HEAR . . . more than seventy-five technical papers read and discussed by experts in the metal world.

VISIT . . . interesting manufacturing plants and go through some of the finest research laboratories in the world.

EXCHANGE . . . ideas and discuss their problems with other leaders in the metal industry.

AND . . . in general to fit themselves for the year ahead—a year that holds promise of being the best since 1929.

This is the educational opportunity of the year. Plan now to be in Chicago when the curtain goes up on this great Show on September 30.

AMERICAN SOCIETY FOR METALS

●

AMERICAN WELDING SOCIETY

●

INSTITUTE OF METALS DIVISION, A. I. M. E.

●

IRON AND STEEL DIVISION, A. I. M. E.

●

THE WIRE ASSOCIATION

●

National Metal Congress & Exposition headquarters will be at The Palmer House.

Make your reservations now by writing or wiring directly to

THE PALMER HOUSE
CHICAGO

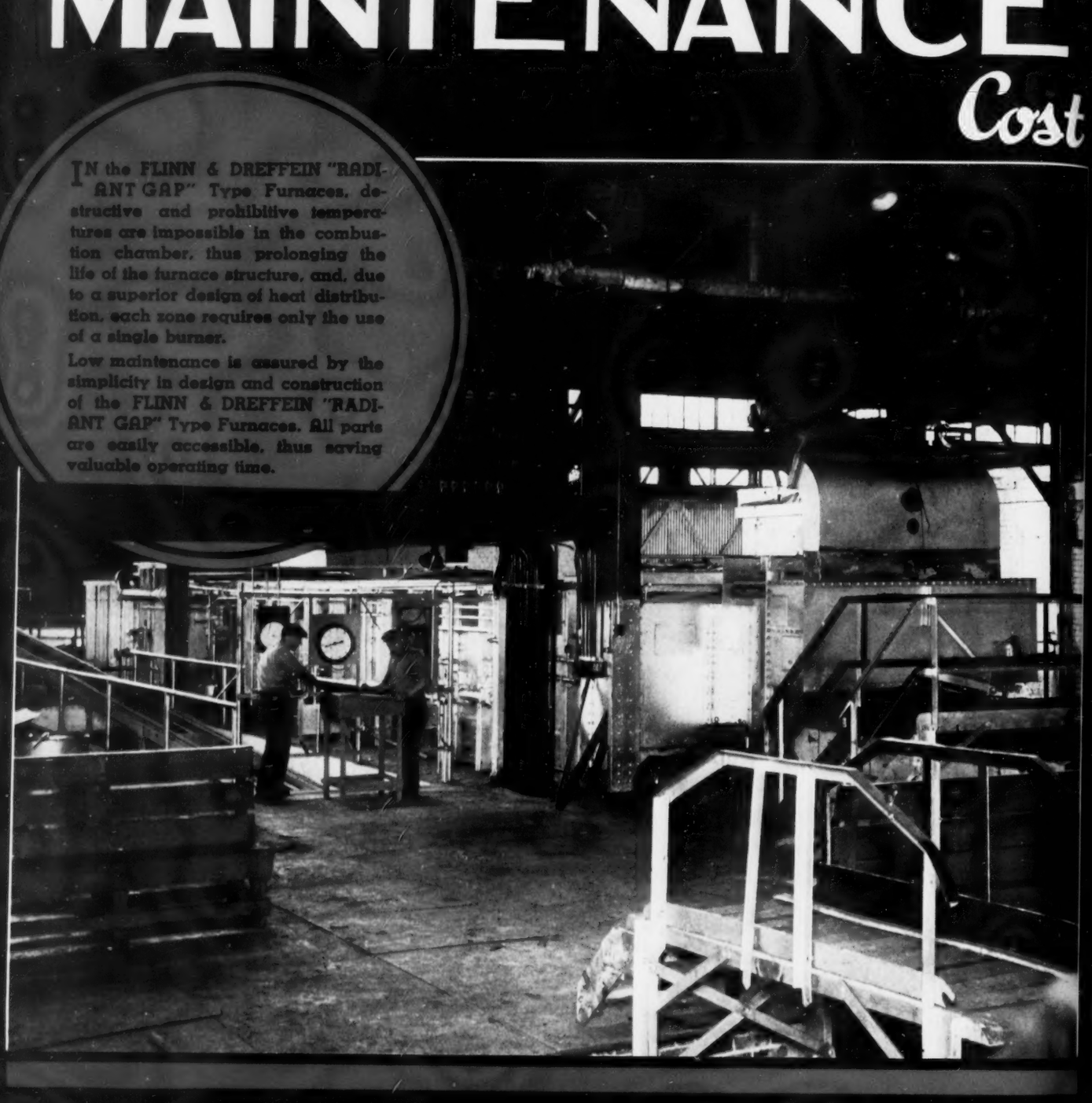
THE NATIONAL METAL CONGRESS AND EXPOSITION

in the New International Amphitheatre, Chicago / September 30, October 1, 2, 3 and 4

Low MAINTENANCE *Cost*

IN the FLINN & DREFFEIN "RADIANT GAP" Type Furnaces, destructive and prohibitive temperatures are impossible in the combustion chamber, thus prolonging the life of the furnace structure, and, due to a superior design of heat distribution, each zone requires only the use of a single burner.

Low maintenance is assured by the simplicity in design and construction of the FLINN & DREFFEIN "RADIANT GAP" Type Furnaces. All parts are easily accessible, thus saving valuable operating time.



The above illustration is used by courtesy of THE NILES ROLLING MILL

FLINN & DREFFEIN COMPANY

CHICAGO, ILLINOIS.

ASSOCIATED COMPANY

THE WEAN ENGINEERING CO., Inc. • Warren, Ohio

The Wean
CONTINUOUS STRIP PICKLER

The WEAN CONTINUOUS PICKLING UNIT, now being offered to the flat rolled industry by the WEAN ENGINEERING CO., Inc., consists of machinery of special design to permit the most efficient production of the finest quality of pickled material.

Higher speeds are possible and greater tonnage procurable on the Wean Continuous Strip Pickling Lines by the use and arrangement of machines of special design.

THE CONTINUOUS PICKLING UNIT CAN BE FURNISHED COMPLETE FROM THE HANDLING OF THE HOT STRIP COIL TO THE FINISHED PRODUCT.

OUR PRODUCTS

AUTOMATIC FEEDING AND CATCHING TABLES.

CONTINUOUS PACE AND PAIR HEATING FURNACES.

WHEELABRATOR ABRASIVE CLEANING EQUIPMENT.

SHEET GALVANIZING EQUIPMENT.

AUTOMATIC TINNING EQUIPMENT.

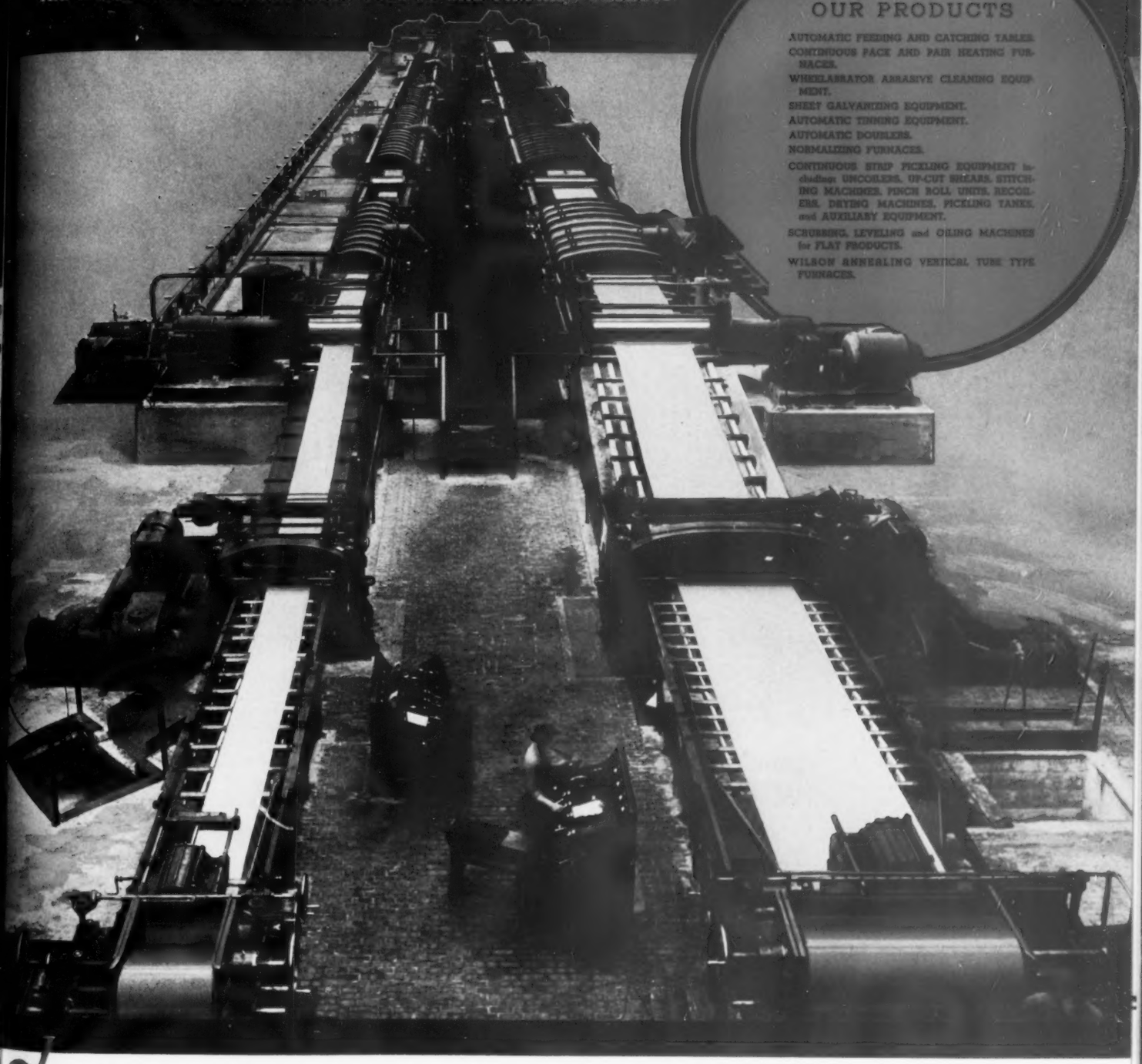
AUTOMATIC DOUBLERS.

NORMALIZING FURNACES.

CONTINUOUS STRIP PICKLING EQUIPMENT including: UNCOILERS, UP-CUT SHEARS, STITCHING MACHINES, PINCH ROLL UNITS, RECOILERS, DRYING MACHINES, PICKLING TANKS, and AUXILIARY EQUIPMENT.

SCRUBBING, LEVELING and OILING MACHINES for FLAT PRODUCTS.

WILSON ANNEALING VERTICAL TUBE TYPE FURNACES.



The WEAN ENGINEERING CO. Inc.

WARREN, OHIO.

ASSOCIATE COMPANIES

The FLINN & DREFFEIN CO. The McKAY MACHINE CO. LEE WILSON ENGINEERING CO.

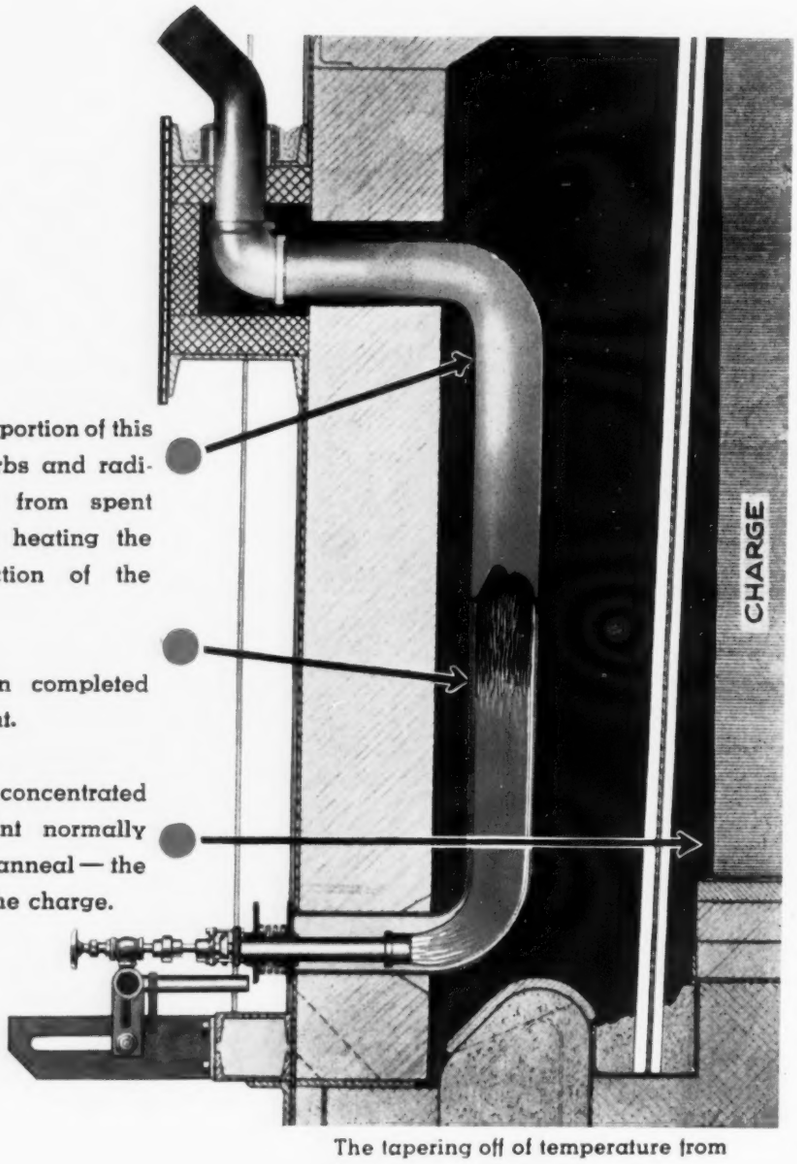
VERTICAL TUBES

THE Vertical Type Radiant Tube effects a 20% saving in annealing time. It produces uniform annealing by applying the heat where it is most needed — at the bottom of the charge.

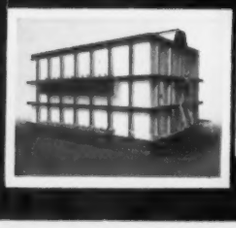
The upper portion of this tube absorbs and radiates heat from spent gases for heating the upper section of the charge.

Combustion completed at this point.

The heat is concentrated at the point normally hardest to anneal — the bottom of the charge.



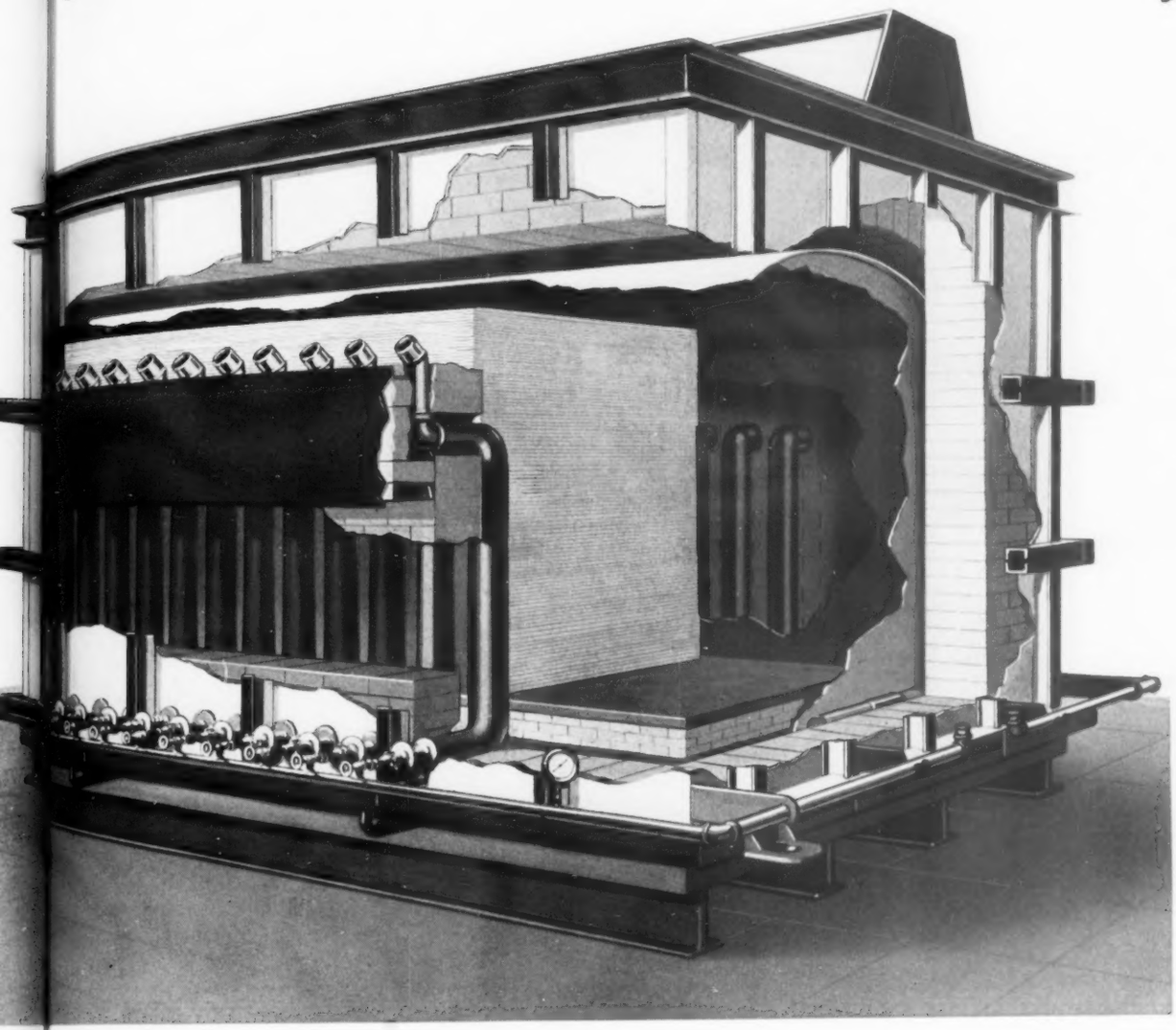
The tapering off of temperature from the point of combustion, common to all tube type heaters, is utilized here to give the proper temperature gradient for uniform heating from the bottom to the top of the charge.



An Exclusive Development of

LEE WILSON

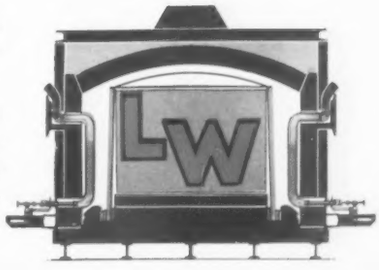
S for better Annealing



y the use of the SINGLE TUBE CON-ROL the vertical tube design permits more accurate and efficient distri-ution of heat to the charge than is ossible in other types of annealing rnaces. Only with vertical tubes is possible to adjust the effective heat-g length of the furnace to the length the charge. Proof of this statement shown in the above sectional, cut-way view of the WILSON VERTI-CAL RADIANT TUBE ANNEALING FURNACE.

Note how overheating of the ends of a short charge is eliminated by shutting off the unnecessary tubes.

The above illustration also shows how this special design and arrange-ment of VERTICAL TUBES permits accurate heat distribution and con-trol, both vertical and horizontal.

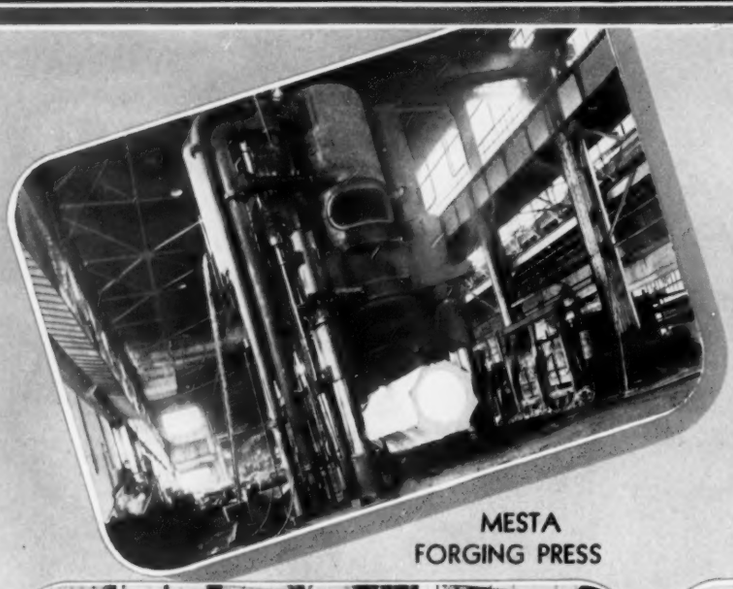


GINEERING CO.

370 Blount Street • Cleveland, Ohio

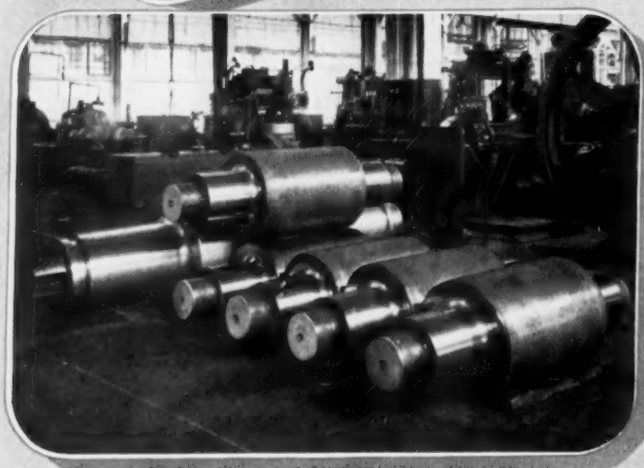
SOLD BY **THE WEAN ENGINEERING CO., INC.,** WARREN, OHIO

MESTA Steel



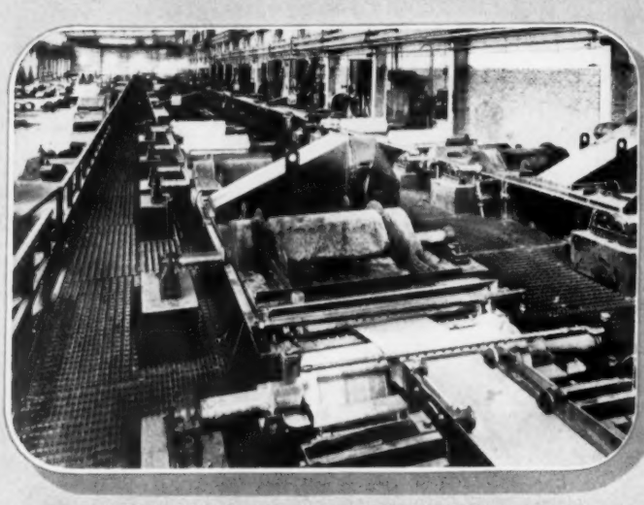
MESTA
FORGING PRESS

FOUR HIGH HOT MILLS
BLOOMING MILLS
ROLLS
ROTARY FLYING SHEARS
PICKLING EQUIPMENT
FORGINGS

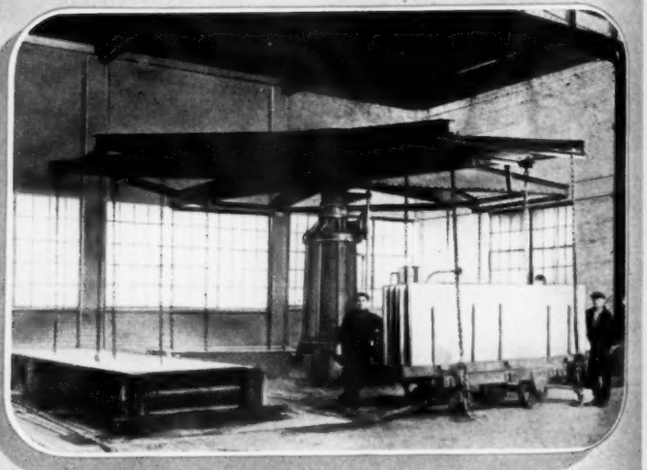


GROUP OF MESTA ROLLS

GROUP OF MESTA FORGINGS



MESTA WIDE CONTINUOUS PICKLING UNIT

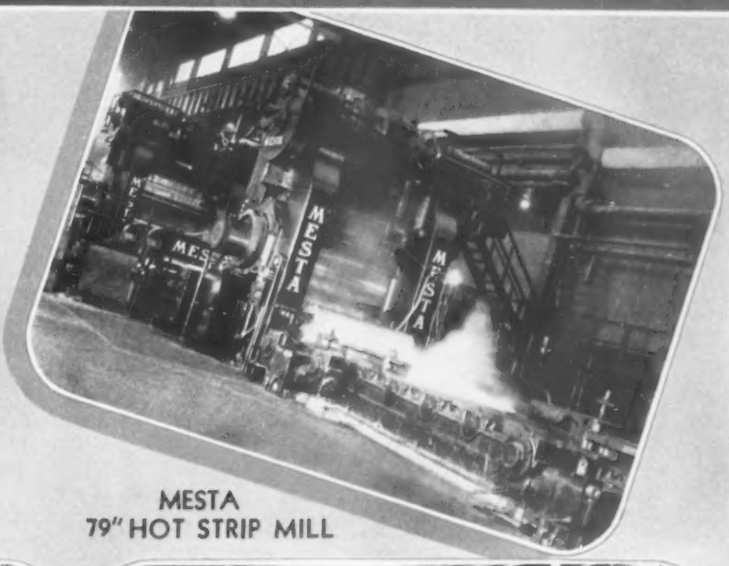


MESTA PATENTED PICKLING MACHINE

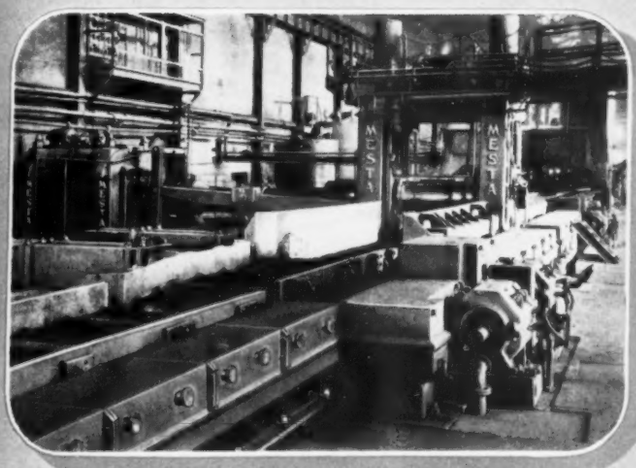
MESTA MACHINE COMPANY

Mill Equipment

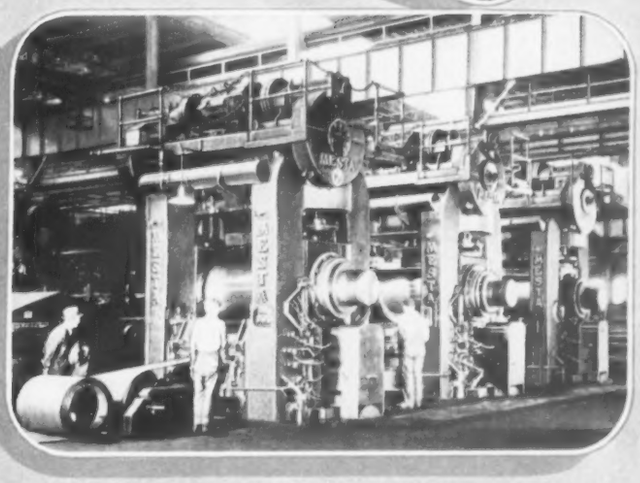
FOUR HIGH COLD MILLS
SLABBING MILLS
ROLL GRINDERS
TRIMMERS & SLITTERS
CLEANING EQUIPMENT
CASTINGS



MESTA
79" HOT STRIP MILL



MESTA 40" BLOOMING MILL



MESTA 54" COLD STRIP MILL

MESTA 79" HOT STRIP MILL

MESTA ROTARY FLYING SHEAR

PITTSBURGH, PA.

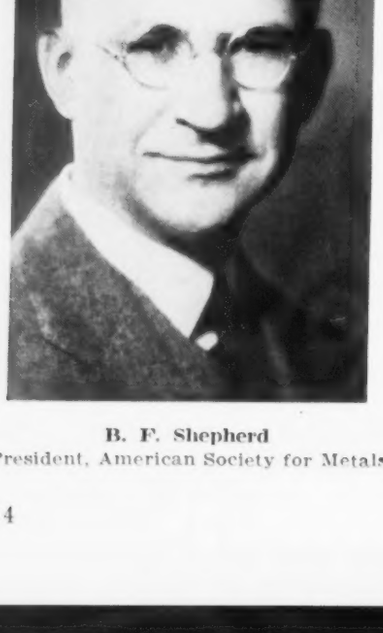
Visitors to Chicago always are impressed with the city's interesting Michigan avenue—this particular birdseye view is toward the north. Kaufmann-Fabry photo

METAL CONGRESS AND SHOW TO BE LARGEST IN FIVE YEARS

THE stage is being set in Chicago for the Seventeenth Annual National Metal congress and exposition, Sept. 30-Oct. 4. The Windy City was host to the First convention and show in 1919, the Eighth in 1926 and the Twelfth in 1930; thus it becomes the first city in the United States to acquire a four-time record. With business and industry definitely on the up-grade, conditions for the 1935 event are particularly favorable.

The exposition will be the largest in five years, or since the last one in Chicago in 1930. Approximately 220 companies have reserved space in the new International Amphitheatre, this being an increase of about 40 per cent over last year's show in New York. It will be necessary to utilize all of the 164,000 square feet afforded by the Amphitheatre, although at the outset it was planned to occupy only a part of it.

Organizer and principal sponsor of the National Metal congress and exposition is the American Society for Metals, prior to 1934 the American Society for Steel Treating. Co-operating in the congress as in past years are the American Welding society, the American Institute of Mining and Metallurgical Engineers, and the Wire association.



B. F. Shepherd
President, American Society for Metals

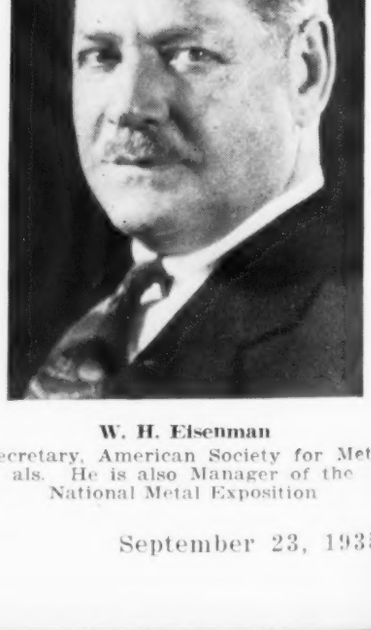
Details of A.S.M. Program

Headquarters for the American Society for Metals will be at the Palmer House. All morning sessions will be held in the hotel; afternoon sessions will be conducted at the new International Amphitheatre to provide proximity to the exposition. A total of 30 technical papers will be presented at 10 sessions. Single sessions will be held morning and afternoon each day from Monday through Friday with the exception of Tuesday morning. On the latter time, two simultaneous sessions will be held, this being a departure from society policy, but a necessity because of the large number of papers available for presentation.

Among special topics for various sessions are metallography on Monday morning; research on Monday afternoon, Thursday morning and afternoon; high-temperature materials on Tuesday afternoon; grain size on Wednesday afternoon; and steelmaking on Friday afternoon.

The annual business meeting of the society will be conducted on Wednesday morning at which time the president, secretary and treasurer will present their formal reports. New officers will be elected.

At the conclusion of the business session, society members will reassemble for the 1935 Campbell memorial lecture to be presented by H.



W. H. Eisenman
Secretary, American Society for Metals. He is also Manager of the National Metal Exposition

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H. W. McQuaid
1935 Campbell Memorial Lecturer, American Society for Metals

W. McQuaid, Republic Steel Co., Massillon, O. The title of Mr. McQuaid's lecture has not been announced. The lecturer holds fame as co-originator of the McQuaid-Ehn grain size test; besides being an authority on grain size, he is nationally known as a specialist in gear steels and case hardening.

William A. Irvin, president, United States Steel Corp., New York, has been announced as the principal speaker for the annual banquet of the society to be served at the Palmer House on Thursday evening. Mr. Irvin will discuss present trends in the steel business and prospects for the future.

Medal awards of the society will be made at the banquet. These will include the Albert Sauveur Achievement medal being awarded for only the second time. This medal, bestowing recognition of a metallurgical achievement which has marked a basic advance in metallurgical knowledge, was established by the society in 1934. Named in honor of Prof. Albert Sauveur, a distinguished member of the society, the first medal was presented to Dr. Sauveur.

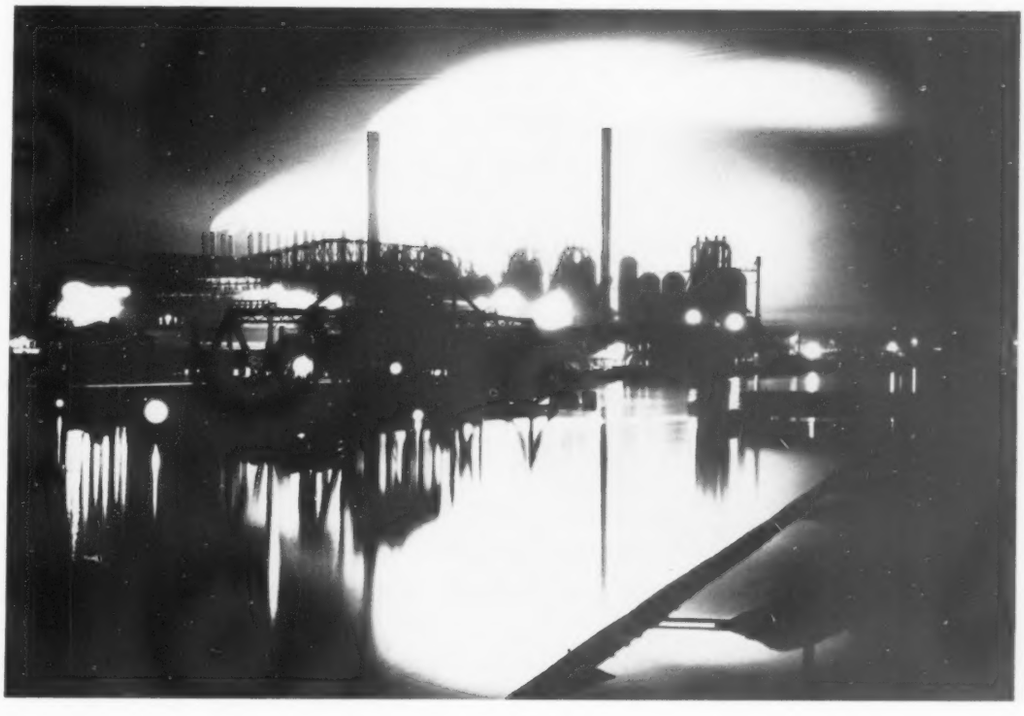
To Award Howe Medal

The Henry Marion Howe gold medal will be awarded to the author of the best technical paper published in the society's *Transactions* during the past year. At the same time, the Past President's medal will be presented to W. H. Phillips, president in 1934.

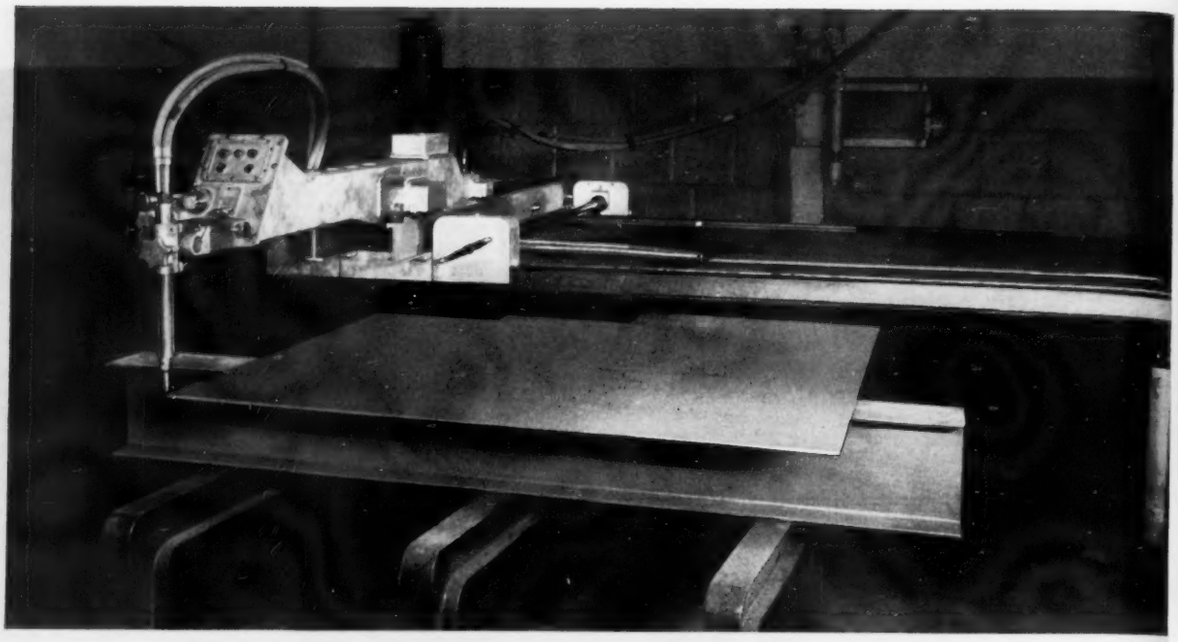
A number of plant visitations are being arranged for the week of the National Metal congress, but at present the complete schedule is not available. Among the plants opening their doors to visitors will be the Illinois Steel Co., South Works; Lindberg Steel Treating Co., and Stewart-Warner Corp.

Reflecting improvement in business activity during the past year, membership in the American Society for Metals reached a new high point. The total on Sept. 1 was 6755, as compared with the previous record of 6300. Practically all of the society's 41 chapters show gains over last year and in some cases, the increases are phenomenal. The principal stimulus to this growth appears to be the educational activities now recognized as impor-

(*Please turn to Page* 107)



LIGHT, shadows and reflections, combined in this unusual panorama of the Illinois Steel Co.'s South Chicago works, add to the romance of steelmaking. May a return to prosperity paint more pictures of its kind! Kaufmann-Fabry photo



THE NEW TYPE CM-12 OXWELD SHAPE CUTTING MACHINE

an important contribution to the Metal Working Industry

This new oxy-acetylene cutting machine is establishing new records for performance. It is the latest word in automatic cutting equipment and embodies many new features and refinements to promote faster production, greater accuracy, and lower operating costs.

Greater Flexibility

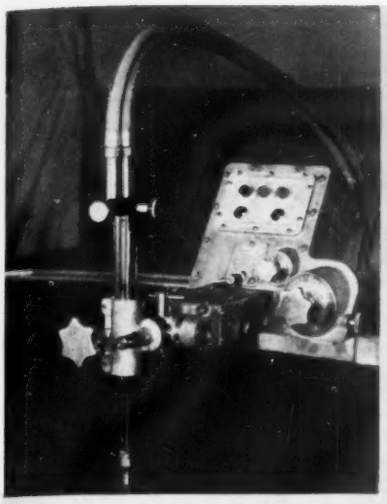
The extreme flexibility of the new Oxweld Shape Cutting Machine will enable manufacturers and designers to achieve new standards in the fabrication of all types of equipment. The increased scope of this machine offers the broadest possibilities of cutting irregular shapes, straight line cuts, rings, circles, bevels, and many forms of multiple work.

Meets Modern Production Demands

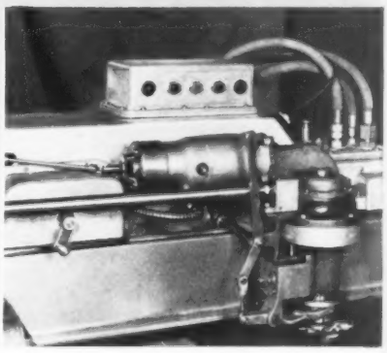
The new Oxweld Shape Cutting Machine has been designed to meet modern production problems. It includes a number of unusual features never before provided by any machine. It permits the widest variety of special cutting operations to be performed.

Oxy-acetylene machine cutting has long been recognized as one of the major tools in the fabrication of steel products. Its use has made possible great advances in the quality of finished work, eliminated many operations, and generally lowered production costs.

Now, all the years of experience, scientific research and engineering of Units of Union Carbide and Carbon Corporation in oxy-acetylene cutting are reflected in the new and



Close-up of front operating panel. Practically every operation of the New Oxweld Shape Cutting Machine can be controlled from this position by the operator. "Start," "Stop" and "Reverse" push buttons for the motor with automatic warning lights: cutting oxygen "On and Off" valve; motor speed dial for setting the motor to operate at any predetermined speed; 360-deg. calibrated dial for cutting at any desired angle; calibrated dials for cutting bevels horizontally or at right angles to the machine, tracer lifting and lowering lever.



Close-up of operating panel and controls at templet or tracing table. Motor push buttons, cutting oxygen, automatic speed control, and lever for tracer are also located in this position, in addition to hand tracing wheel.

improved Oxweld Shape Cutting Machine. It is an outstanding addition to the large number of cutting machines developed to meet the specialized needs of the metal working industry.

Available from Linde

The new Oxweld Shape Cutting Machine is available through all Linde Sales Offices. A call will bring a Linde representative with full details of this new machine. He will help you to form a comprehensive picture of its possibilities in your plant—without obligation.

Linde Sales Offices are located in thirty principal cities throughout the country and at 30 East 42nd Street, New York, N. Y. Address The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

REVOLUTIONARY FEATURES ON THE NEW OXWELD SHAPE CUTTING MACHINE

Rugged crane type aluminum alloy carriage assures extreme rigidity and high degree of accuracy in cutting. The working mechanism is fully enclosed.

Dual controls, semi-automatic, give greatest flexibility, permit adjustments to be made at cutting blowpipe or at machine. Signal lights indicate whether machine is going forward or in reverse.

Cutting speeds range from 1½ to 30 in. per min. Speed of cut can be set on calibrated dial at front of machine or at motor if hand tracing device is being used.

Tracer lifting and guiding device can be operated at the blowpipe or at the tracing table.

Machine is quickly converted from automatic templet control to hand tracing.

Ball bearings on the carriage assure smooth, easy, frictionless operation.

Carriage can be locked for cutting straight lines, eliminating templets or other devices for such work.

Angular cuts can be made at any degree automatically. Pointer on calibrated scale of 360 deg., located on front control panel, can be set at any desired angle.

Blowpipe holder provided with calibrated pivots permits bevel cutting at any desired angle.

New cutting blowpipe has increased capacity. Cutting oxygen controls, independent of blowpipe, located in two positions.

Machine can be adapted for multiple cutting by the addition of blowpipes.

All electrical wiring is concealed in conduits. A plug connector at rear of carriage connects to power line.

Oxygen and acetylene are carried in brass pipes through blowpipe carrier arm, and terminate in hose connections at the forward and rear ends of the carriage.

Connections are provided for continuous water cooling of certain types of cutting blowpipes.

Safety stops prevent accidental damage to traveling blowpipe carriage.

Your Opportunity

You can see the new
Oxweld Shape Cutting Machine
in operation at
the UCC Exhibit
Booths I-1, H-1 and H-2
Chicago National Metal Exposition
Chicago International Amphitheatre
Sept. 30—Oct. 1-2-3-4, 1935

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

OXWELD WELDING AND CUTTING APPARATUS AND SUPPLIES
LINDE OXYGEN · UNION CARBIDE · PREST-O-LITE DISSOLVED ACETYLENE

SEE THE J&L STEEL AT THE NATIONAL

Jones & Laughlin cordially invites all delegates and visitors to the National Metal Congress and Exposition to see its exhibits of J & L Steel products in Spaces C-11 and D-11. In this exhibit you will see not only samples of Jones & Laughlin products, but interesting examples of the work for which different manufacturers are using them.

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA

Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Erie, Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco

Warehouses: CHICAGO, CINCINNATI, DETROIT, MEMPHIS, NEW ORLEANS, PITTSBURGH

Canadian Representatives: JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont., Canada

EXHIBIT METAL EXPOSITION

CHICAGO
SEPT. 30 - OCT. 4

J & L exhibits which will be of particular interest to members of the American Society for Metals and of the Societies associated with it in the National Metal Congress are the following:

JALCASE STEEL
Available in .10/.20, .25/.35 and .30/.40 carbon grades. Exhibit shows sample bars of Hot Rolled and Cold Finished Jalcase, test specimens and examples of the work for which Jalcase is being used.

IMPROVED BESSEMER SCREW STEEL
Available in SAE-1112 and SAE-X1112 grades, and supplied in hot rolled bars, cold finished bars and in drawn wire. Exhibit shows sample bars as well as typical examples of the use of Improved Bessemer Screw Steel.

FORGING STEEL
Forging steel of highest quality, produced under strict metallurgical control and rolled on Jones & Laughlin's newest bar mill. Exhibit shows typical parts made of J & L Forging Steel.

COLD HEADING WIRE
Cold heading wire with high quality assured through the painstaking care which Jones & Laughlin devotes to all the factors entering into its manufacture. Exhibit shows a number of examples of the work for which manufacturers are using J & L Cold Heading Wire.

STANDARD SPRING WIRE
Spring wire with the resilience to give just the right springiness and the stamina to hold that springiness indefinitely. Exhibit shows a wide variety of springs made of J & L Standard Spring Wire.

COLD FINISHED SHAFTING
Turned and Ground, Turned and Polished and Cold Drawn. Exhibit shows samples of J & L Turned and Ground Shafting in four sizes.

TIN PLATE AND BLACK SHEETS (Tin Mill Sizes)
Including Jalcold Quality
Exhibit shows J & L Coke Tin Plate and Black Plate in various finishes.

HOT ROLLED BARS AND SHAPES
Exhibit shows a number of samples of J & L bars and shapes.

COLD FINISHED BARS AND SHAPES
Exhibit shows a number of samples of J & L cold finished bars and shapes.

Technical Literature

Technical Literature covering all the J & L products on display will be available at the J & L Exhibit, Spaces C-11 and D-11.

Program of American Society for Metals

Monday, Sept. 30

10:00 A.M.—Palmer House Ballroom

Metallography Session

"On the Preparation of Iron and Steel Specimens for Microscopic Investigations," by F. F. Lucas, Bell Telephone Laboratories, New York.
"Oxalic Acid as an Electrolytic Etching Reagent for Stainless Steels," by G. A. Ellinger, National bureau of standards, Washington.
"On Naming the Aggregate Constituents in Steel," by J. R. Vilella, G. E. Guellich and E. C. Bain, United States Steel Corp., New York.

2:00 P.M.—International Amphitheatre

Research Session

"Arc Welding of High Carbon and Alloy Steels," by T. N. Armstrong, Norfolk navy yard, Portsmouth, Va.
"A Dilatometric Study of the Alpha-Gamma Transformation in High Purity Iron," by C. Wells, R. A. Ackley and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh.
"Some Transient Phase Changes During the Graphitizing Reaction," by H. A. Schwartz, H. H. Johnson and C. H. Junge, National Malleable & Steel Casting Co., Cleveland.

4:30 P.M.—International Amphitheatre

Educational Course

"Heat Treatment of Steel," lecture No. 1 by Dr. M. A. Grossmann, Illinois Steel Co., Chicago.

7:30 P.M.—International Amphitheatre

Educational Course

"Spectrographic Analysis" lecture No. 1, by Dr. E. J. Martin, General Motors Corp., Detroit.

Tuesday, Oct. 1

10:00 A.M.—Palmer House Ballroom

General Session

"Chromium Steels of High Nitrogen Content," by Russell Franks, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y.
"Correlation of Failures from Embrittlement of 4 to 6 Per Cent Chromium Steel with the Notched Bar Impact Test," by H. M. Wilten, Texas Co., Port Arthur, Tex.
"Factors Influencing the Nature of the Cutting Speed-Tool Life Curves," by O. W. Boston, W. W. Gilbert and C. E. Kraus, University of Michigan, Ann Arbor, Mich.

10:00 A.M.—Palmer House Ballroom

General Session

"High Temperature Properties of Nickel-Cobalt-Iron Base Age-Hardening Alloys," by C. R. Austin, Pennsylvania State college, State College, Pa.
"Observations on the Oxidation of Steel," by M. Baeyertz, Illinois Steel Co., Chicago.

2:00 P.M.—International Amphitheatre

High Temperature Session

"Physical Properties of Metals as Affected by Ammonia Synthesis," by H. L. Maxwell, E. I. duPont de Nemours & Co., Wilmington, Del.
"Influence of Carbon Content on the High-Temperature Properties of Steels," by A. E. White and C. L. Clark, University of Michigan, Ann Arbor, Mich., and R. L. Wilson, Timken Steel & Tube Co., Canton, O.
"A New Heat-Resistant Alloy," by S. L. Hoyt and M. A. Scheil, A. O. Smith Corp., Milwaukee.

4:30 P.M.—International Amphitheatre

Educational Course

"Heat Treatment of Steel," lecture No. 2, by Dr. M. A. Grossmann, Illinois Steel Co., Chicago.

7:30 P.M.—International Amphitheatre

Educational Course

"Spectrographic Analysis," lecture No. 2, by Dr. E. J. Martin, General Motors Corp., Detroit.

Wednesday, Oct. 2

9:30 A.M.—Palmer House Ballroom

Annual Meeting of American Society for Metals.
Edward de Mille Campbell Memorial Lecture, by H. W. McQuaid, Republic Steel Corp., Massillon, O.

2:00 P.M.—International Amphitheatre

Grain Size Session

"Effect of Carbon, Oxygen and Grain Size on the Magnetic Properties of Iron-Silicon Alloys," by T. D. Yensen, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and N. A. Ziegler, West Penn Electric Co., Pittsburgh.
"Grain Size and Its Influence on Surface Decarburization of Steel," by D. H. Rowland and Clair Upthegrove, University of Michigan, Ann Arbor, Mich.
"Austenite Grain Size in Cast Iron," by D. W. Murphy and W. P. Wood, University of Michigan, Ann Arbor, Mich.

4:30 P.M.—International Amphitheatre

Educational Course

"Heat Treatment of Steel," lecture No. 3, by Dr. M. A. Grossmann, Illinois Steel Co., Chicago.

7:30 P.M.—International Amphitheatre

Educational Course

"Spectrographic Analysis," lecture No. 3, by Dr. E. J. Martin, General Motors Corp., Detroit.

Thursday, Oct. 3

10:00 A.M.—Palmer House Ballroom

Research Session

"Notes on the Solidus Temperatures in the Systems Iron-Tungsten and Iron-Molybdenum," by W. P. Sykes, General Electric Co., Cleveland.
"Influence of Deoxidation on the Aging of Mild Steels," by B. N. Daniloff and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh, and C. H. Herty Jr., Bethlehem Steel Co., Bethlehem, Pa.
"Aging of Steel," by E. S. Davenport and E. C. Bain, United States Steel Corp., New York.

2:00 P.M.—International Amphitheatre

Research Session

"Endurance of Case Hardened Gears," by O. W. McMullen, International Nickel Co. Inc., Bayonne, N. J.
"Pickle Pitting by Electrolytic Potentials as Affected by Scaling Temperatures," by C. H. McCollam and D. L. Warrick, Timken Steel & Tube Co., Canton, O.
"Damping Capacity—a Factor in Fatigue," by G. R. Brophy, General Electric Co., Schenectady, N. Y.

4:30 P.M.—International Amphitheatre

Educational Course

"Heat Treatment of Steel," lecture No. 4, by Dr. M. A. Grossman, Illinois Steel Co., Chicago.

7:00 P.M.—Palmer House Ballroom

Annual banquet of American Society for Metals. Speaker: William A. Irvin, president, United States Steel Corp., New York.

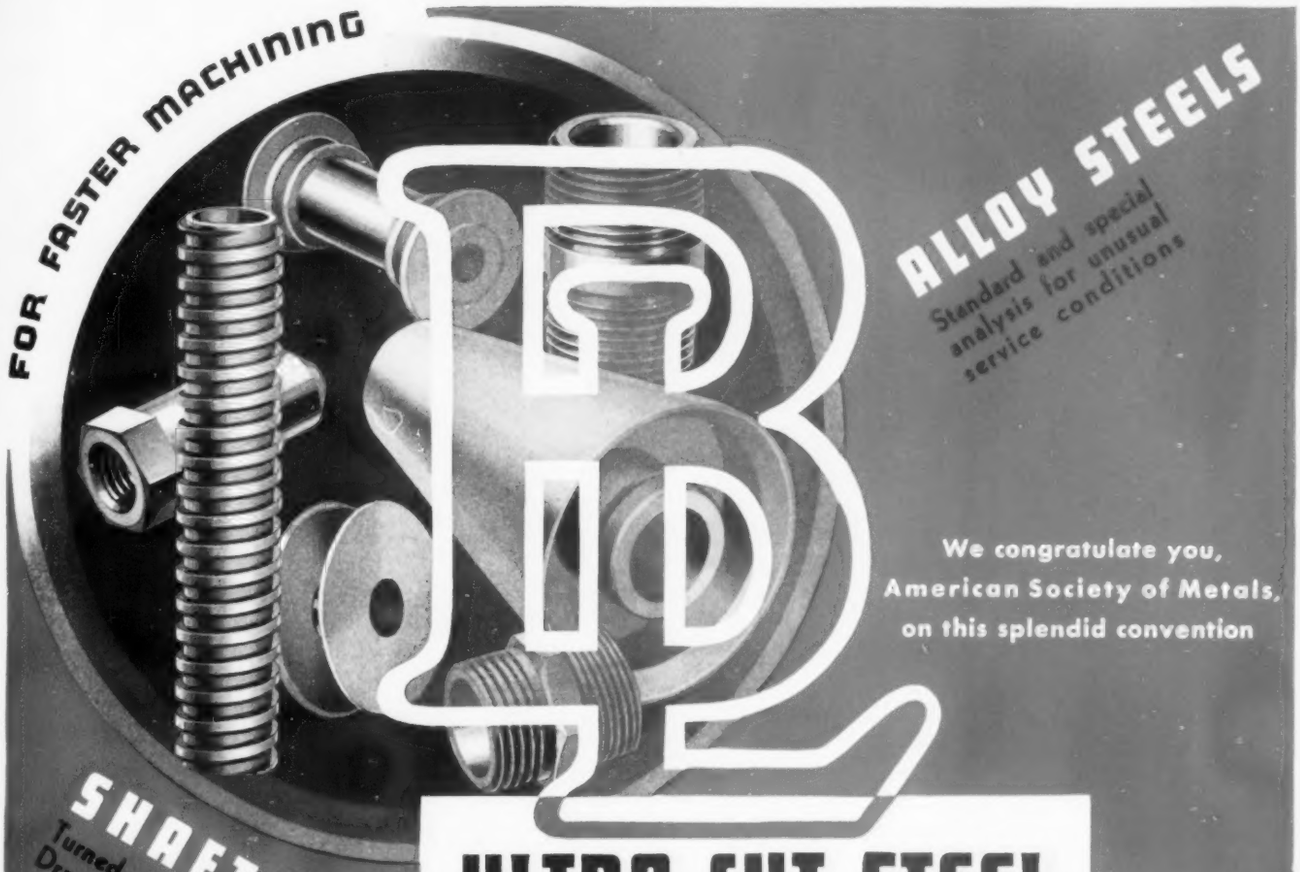
Friday, Oct. 4

10:00 A.M.—Palmer House Ballroom

"Hardening Characteristics of 1 Per Cent Carbon Tool Steels," by T. G. Digges and Louis Jordan, National bureau of standards, Washington.
"Interpretation of Torsion Impact Properties of Carbon

(*Please turn to Page* 107)

FOR FASTER MACHINING



ALLOY STEELS
Standard and special analysis for unusual service conditions

We congratulate you, American Society of Metals, on this splendid convention

SHAFTING
Turned, ground, polished
Drawn, ground, polished

FREE-CUTTING SCREW STOCK
For fabricating finely finished machine parts

SPECIAL SECTIONS
Convenient shapes that reduce the cost of machining

SMALL ROUNDS
Cold drawn, ground and polished to mirror finish

EXTRA WIDE FLATS
For bed plates and other equipment parts

ULTRA-CUT STEEL

ACTUAL running conditions in the shop *on our customers' machines*—rather than staged tests—are the true measure of performance for Ultra-Cut Screw Stock. This group of parts showed an average increase of 45% in production when fabricated from Ultra-Cut as compared to the former grades of stock used.

Let us demonstrate this fast-cutting, smooth-machining screw stock in fabricating your product. The results may indicate interesting possibilities in cost reduction and product improvement. Ask for Ultra-Cut Folder.

BETTER MADE STEELS
LABORATORY TESTED

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HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

PIONEERING BEYOND INDUSTRY'S HORIZON

The Carborundum Company realizes its responsibility to the metal working industry

THE constant aim of the organization is to develop and investigate new abrasive materials—new combinations of bond and abrasive—to set new precedents for productive performance. This is termed Research.

A new grinding machine, a new steel, iron or alloy is produced—new tools and parts come into being over night—their introduction presents new grinding problems calling for a new series of grinding wheels—a new grinding technique. Carborundum must be ready ahead of time.

Carborundum engineering service must put the right wheel in the right place for every grinding job from hair split precision of centerless, cylindrical, internal and tool room work to the heavy snagging jobs of the foundry.

Carborundum engineering facilities are available to the metal working industry, the metallurgist, the machine tool builder—to all who are pioneering beyond present horizons.

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TWO NEW TOOL ROOM WHEELS

You will recognize this improved Aloxite Brand "AA" Wheel by its clean, pure white color. And what a wheel it is!

The improved "AA" Grain in combination with the new "170 bond" gives a wheel freer in its cut with greater ease of penetration requiring less pressure. It has less bond interference—the newly developed aluminum oxide grain getting a real chance to go into action.

It is a balanced wheel as to grain, bond and structure with just the right self-sharpening characteristics. It has maximum flexibility—taking light to heavy cuts with the same decided efficiency with low wheel wear. It handles a wider range of steels and wider areas of contact.

It requires less dressing, saving time and diamonds. It generates less heat which results in less work distortion and checking.

This improved "AA" wheel has everything. All of the "niceties" that a great tool room wheel should have.

The New "270 Bond" Tool Room Wheel

Here is a new production wheel for the tool room. The "Blue Wheel" is made of a new type of aluminum oxide abrasive combined with the "170 bond" and known as the "270 Bond"—the Blue Wheel. It is produced particularly for the grinding of duplicate parts. A tool room production wheel to be used where there is a duplication of grinding operations and where flexibility is not essential. Fast, clean cutting, long lived, definitely economical.

The "AA"—"170 Bond" wheel for your special jobs.

The "270 Bond" wheel for production.

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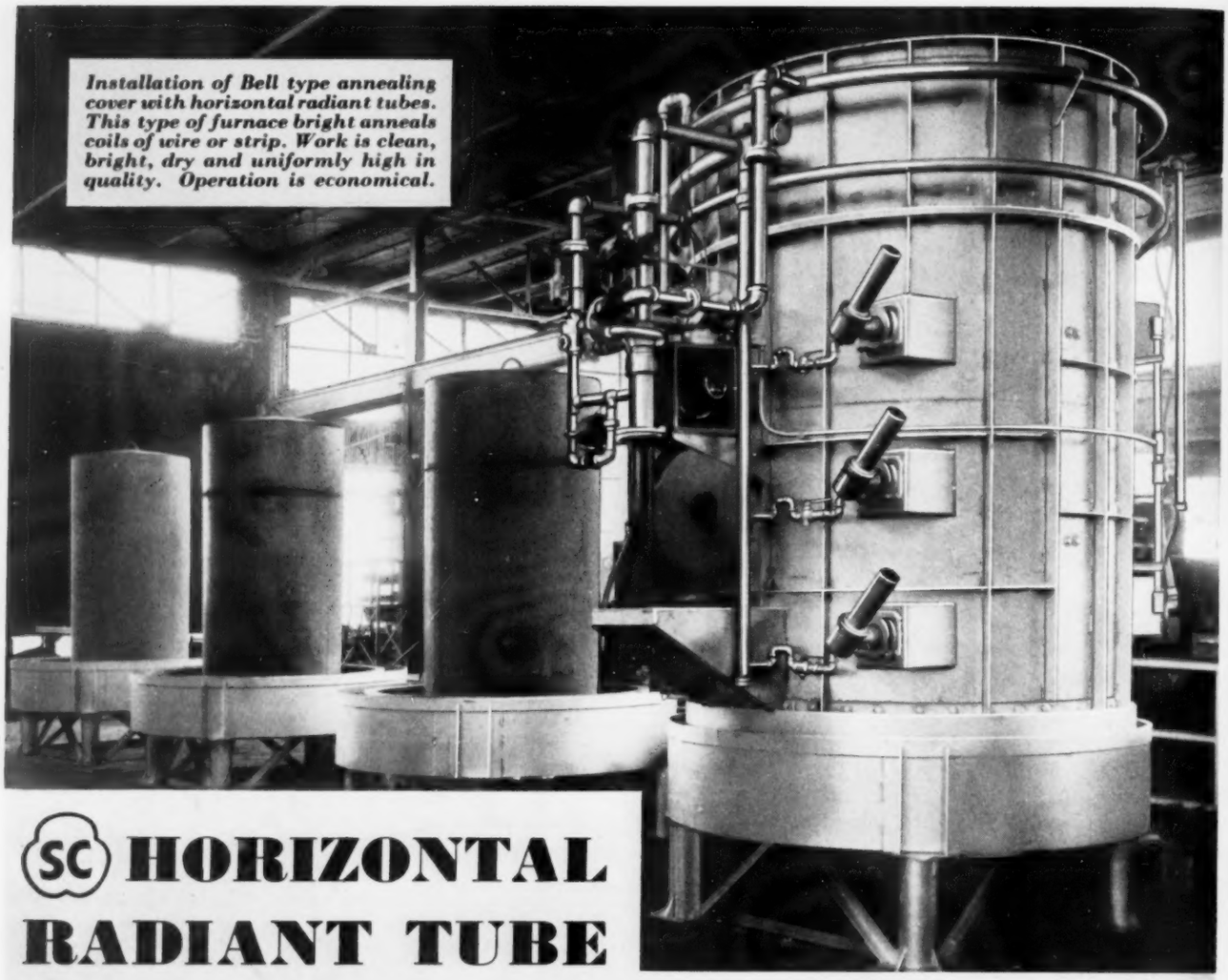
National Metal Congress

Many outstanding examples of grinding and finishing and the Carborundum products that did the work.

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.



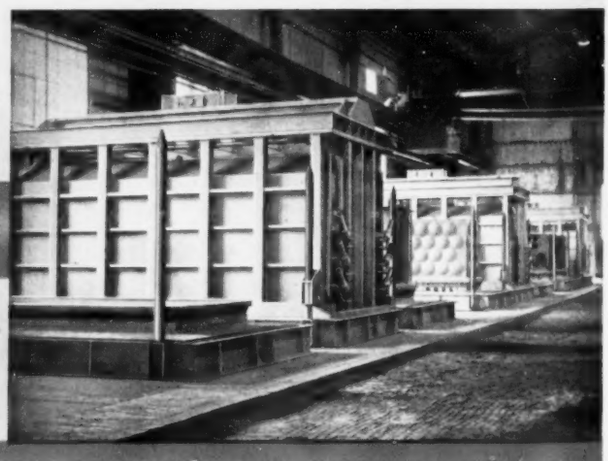
Installation of Bell type annealing cover with horizontal radiant tubes. This type of furnace bright anneals coils of wire or strip. Work is clean, bright, dry and uniformly high in quality. Operation is economical.

(SC) HORIZONTAL RADIANT TUBE ANNEALING COVERS--ROUND OR RECTANGULAR

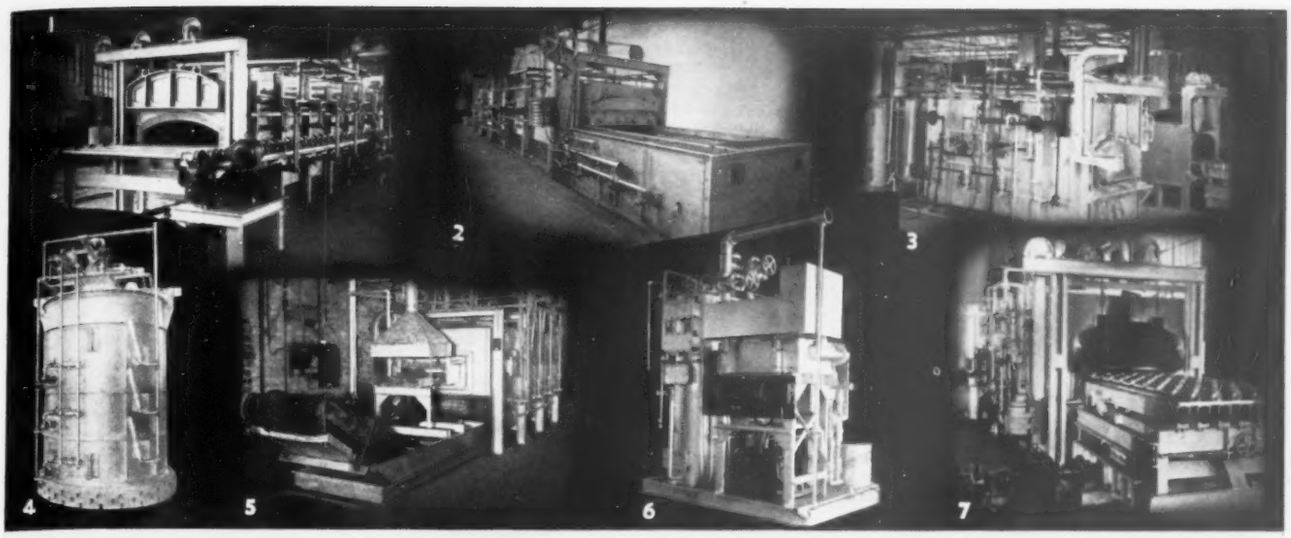
are the only covers using the Efficient Horizontal Heating elements. These covers are available in a wide range of standard sizes in either rectangular or circular types. Whether annealing tin plate, sheets, wire or strip *they produce more tons of quality annealed material per capital invested.* And these results are produced in actual operation; at a *lower fuel consumption per ton.*

Surface Combustion (SC) Corporation

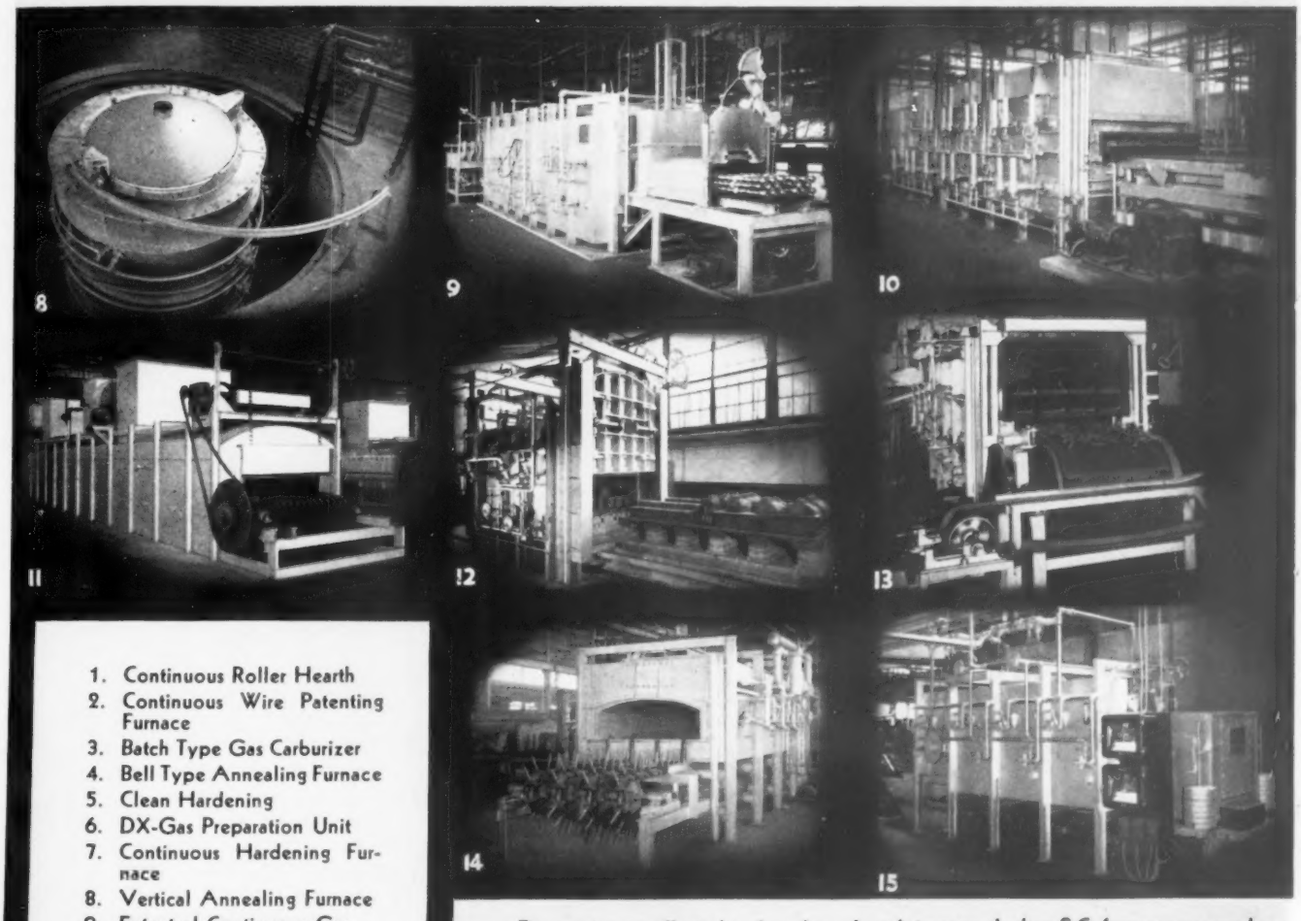
TOLEDO, OHIO Sales and Engineering Service in Principal Cities



Battery of three SC horizontal Radiant Tube Annealing Covers used with nine bases and six inner covers in large sheet mill. Each cover anneals load of sheets 60" x 186" x 58" high, weighing approximately 150,000 lbs., to a temperature of 1325°F.



FOR ANY HEAT TREATING OPERATION



1. Continuous Roller Hearth
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3. Batch Type Gas Carburizer
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12. Carbottom Annealing Furnace
13. Continuous Mesh Belt Annealing Furnace
14. Continuous Heating Furnace
15. Clean Hardening Furnace.

Economies are effected and quality of work improved when S.C. furnaces are used.

Surface Combustion designs and builds furnaces for either batch or continuous carburizing, hardening, drawing, annealing, galvanizing, forging. Also controlled atmosphere furnaces are available for bright annealing of ferrous or non-ferrous metals, for gas carburizing, forging, nitriding or clean hardening of steel—for either batch or continuous operation.

S.C. Engineers with their broad background of experience gained from thousands of industrial installations, will be glad to consult with you regarding your heat treating problems.

Surface Combustion Corporation

TOLEDO, OHIO

Sales and Engineering Service in Principal Cities

(SC) The makers of ATMOSPHERE FURNACES . . . HARDENING, DRAWING, NORMALIZING ANNEALING FURNACES . . . FOR CONTINUOUS OR BATCH OPERATION

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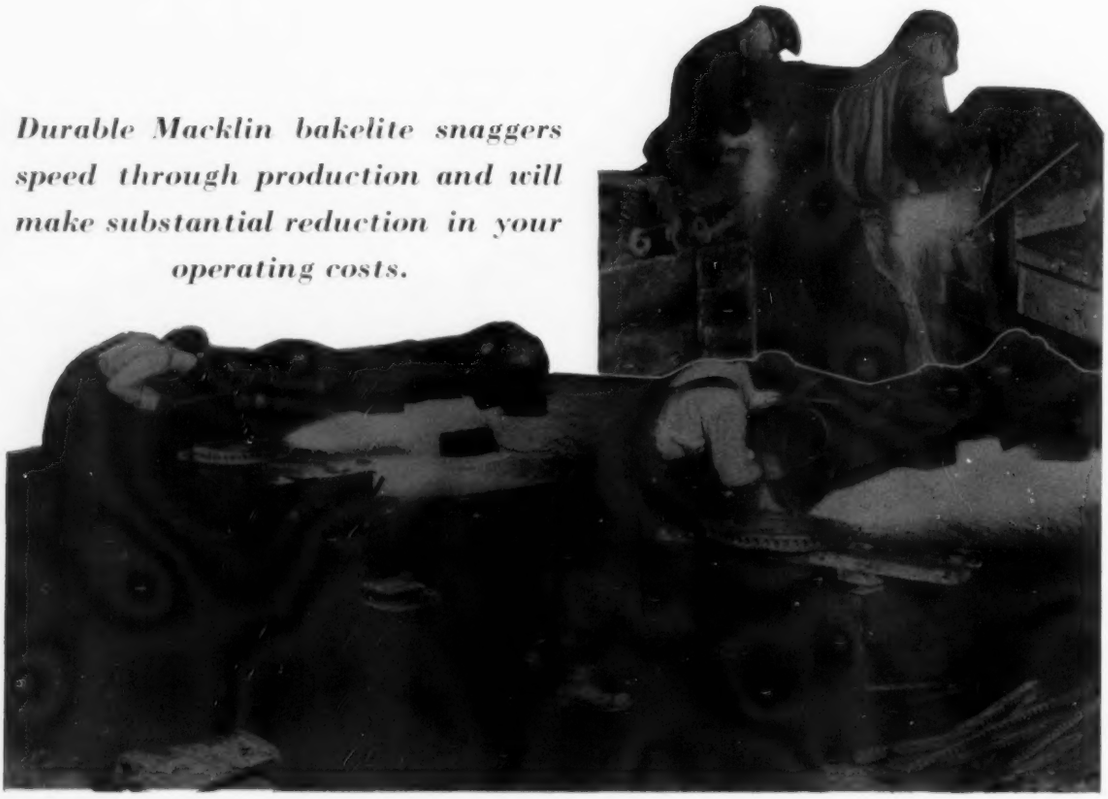
WHEELS

Durable Macklin bakelite snaggers speed through production and will make substantial reduction in your operating costs.



Production schedules are easily maintained when floor stands and swing frame grinders are Macklin equipped.

Our field engineers, from their experience in many plants, are in a position to help you with your problem. Call upon them for suggestions, without obligation.

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Manufacturers of GRINDING WHEELS—JACKSON, MICHIGAN, U. S. A.

Sales Offices:—Chicago—New York—Detroit—Pittsburgh—Cleveland—Cincinnati—Milwaukee

Program of American Society for Metals (Concluded from p. 100)

Tool Steels," by G. V. Luerssen and O. V. Greene, Carpenter Steel Co., Reading, Pa.

"Contributory Effects of Furnace Atmospheres on the Grain Size of Molybdenum High-Speed Steel," by Arthur Phillips and M. J. Weldon, Yale university, New Haven, Conn.

2:00 P.M.—INTERNATIONAL AMPHITHEATRE

Steelmaking Session

"Open-Hearth Temperature Control," by Earnshaw Cook, American Brake Shoe & Foundry Co., Chicago Heights, Ill.

"Effect of Deoxidation on the Rate of Formation of Ferrite in Commercial Steels," by D. L. McBride and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh, and C. H. Herty Jr., Bethlehem Steel Co., Bethlehem, Pa.

"Equilibrium in the Reaction of Hydrogen with Ferrous Oxide in Liquid Iron at 1600 Degrees Cent." by John Chipman, American Rolling Mill Co., Middletown, O., and M. Fontana, E. I. du Pont de Nemours & Co., Wilmington, Del.

4:30 P.M.—INTERNATIONAL AMPHITHEATRE

Educational Course

"Heat Treatment of Steel," lecture No. 5, by Dr. M. A. Grossmann, Illinois Steel Co., Chicago.

Metal Congress and Show Largest in Five Years

(*Concluded from Page* 95)

tant and necessary complements to chapter meeting programs.

National officers of the American Society for Metals are: President, B. F. Shepherd, manager, rock drill division, Ingersoll-Rand Co., Phillipsburgh, N. J.; vice president and nominee for president, R. S. Archer, metallurgical department, Republic Steel Corp., Chicago; treasurer, Emil Gathmann, president, Gathmann Engineering Co., Baltimore; and secretary, W. H. Eisenman, Cleveland.

Trustees of the society are: Past President W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh; E. C. Bain, assistant to vice president, United States Steel Corp., New York; G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; W. P. Woodside, vice president, Climax Molybdenum Co., Detroit; and Walter Mathesius, general superintendent, Illinois Steel Co., South Works, Chicago.

Two Educational Courses To Be Featured This Year

SO PHENOMENAL has been the success of chapters of the American Society for Metals in sponsoring education activities that the national organization initiated an educational course during the National Metal congress in New York last fall. The response to this effort, a course on "Tool Steels" by James P. Gill, was so favorable that it was considered advisable to continue similar work this year.

Therefore, the program for the 1935 convention in Chicago provides two educational courses. The first, a five-lecture course on "Heat Treatment of Steel," by Dr. M. A. Grossmann, director of research, Illinois Steel Co., Chicago, will be given at 4:30 p.m. each afternoon from Monday through Friday at the International Amphitheatre. The second course on "Spectrographic Analysis" will be conducted by Dr. E. J. Martin, research division, General Motors Corp., Detroit, at 7:30 p.m. Monday through Wednesday at the International Amphitheatre.

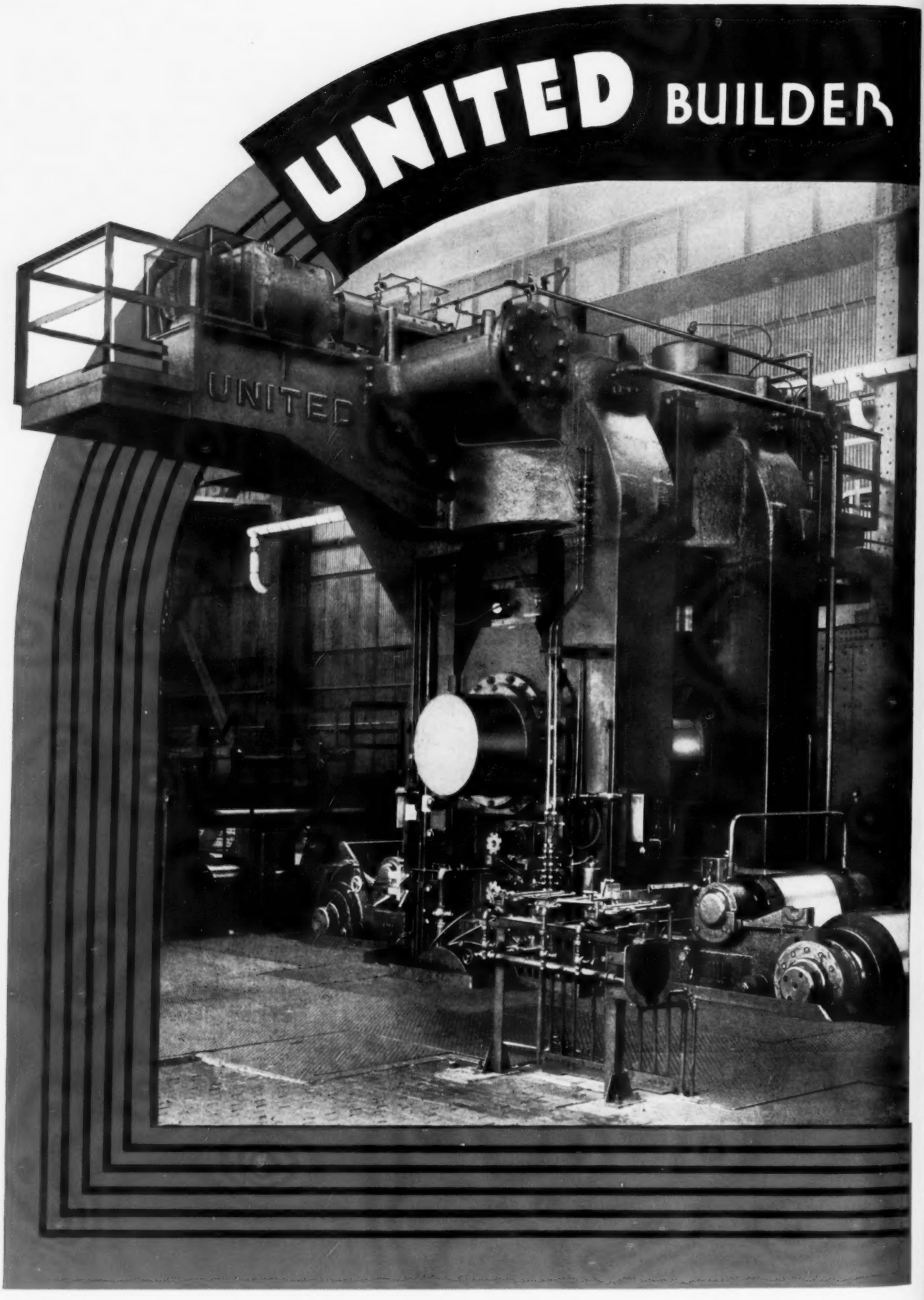
The heat treatment course is offered without cost to members of the American Society for Metals, enrollment to be applied for not later than Monday noon, Sept. 30. Members may enroll for single lectures. The spectrography course will be open to anyone attending the Metal congress.

Dr. Grossmann is one of the foremost experts on carbon and alloy steels with 25 years' experience in the manufacture and heat treatment of steel. He was the society's Campbell memorial lecturer in 1930. The outline of lectures is as follows: I—Principles of Hardening; II—Principles and Variations of Hardening; III—Normalizing, Tempering and Hot Quenching; IV—Case Hardening, Grain Size and Annealing; and V—Iron-Carbon Diagram, Equipment for Heat Treating, and Commercial Heat Treating Data.

Interest in Spectography

The course on spectrographic analysis is particularly timely, for the reason that this method, for some time regarded as an instrument of the scientist and physicist, is rapidly finding an important place in progressive metalurgical laboratories as a valuable technological method for the detection and determination of elements present in steels and alloys. The first lecture will be devoted to equipment and source of light, the second to qualitative analysis, and the third to quantitative analysis.

CHICAGO AT NIGHT MAKES A STRIKING PICTURE. This view shows Michigan avenue where it crosses the Chicago river. Wacker drive extends to the right along the river front. Acme photo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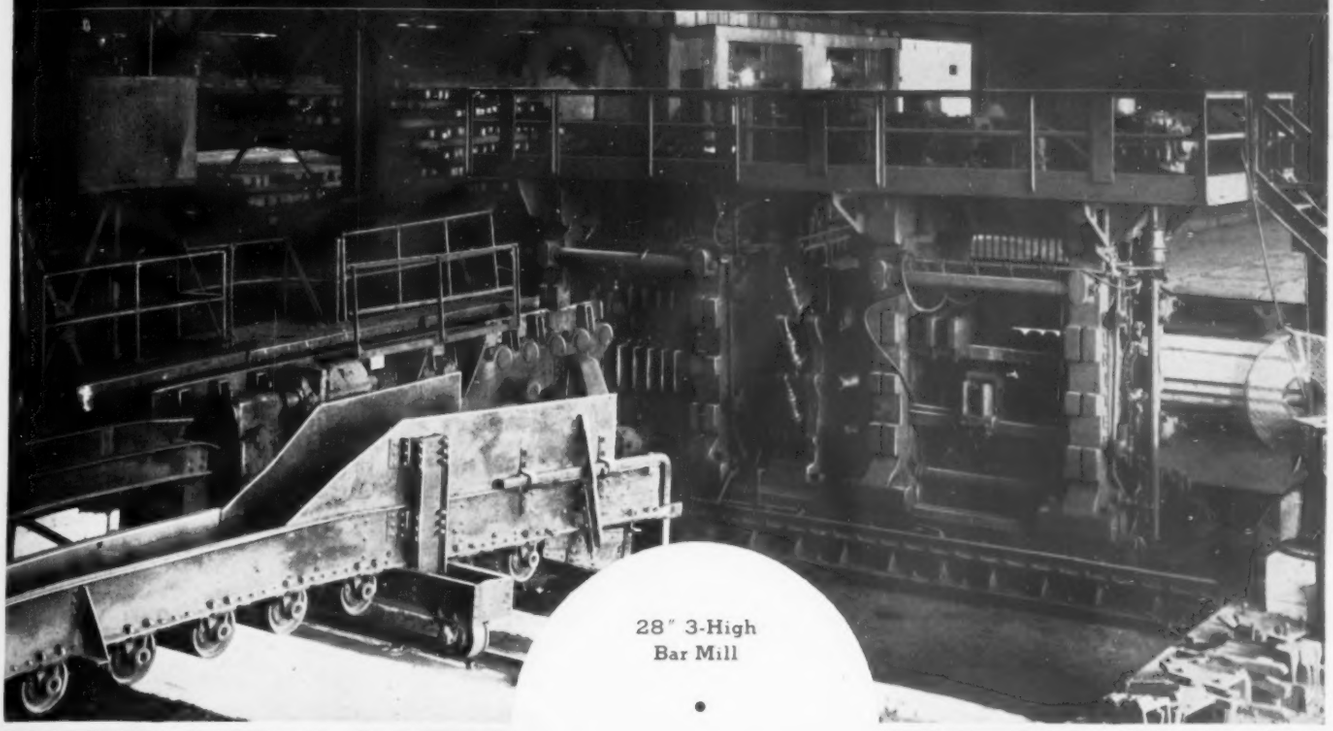
OF SUCCESSFUL PLANTS



28″ 3-High
Bar Mill

•

96″ Continuous
Strip Mill

54″ Blooming
Mill

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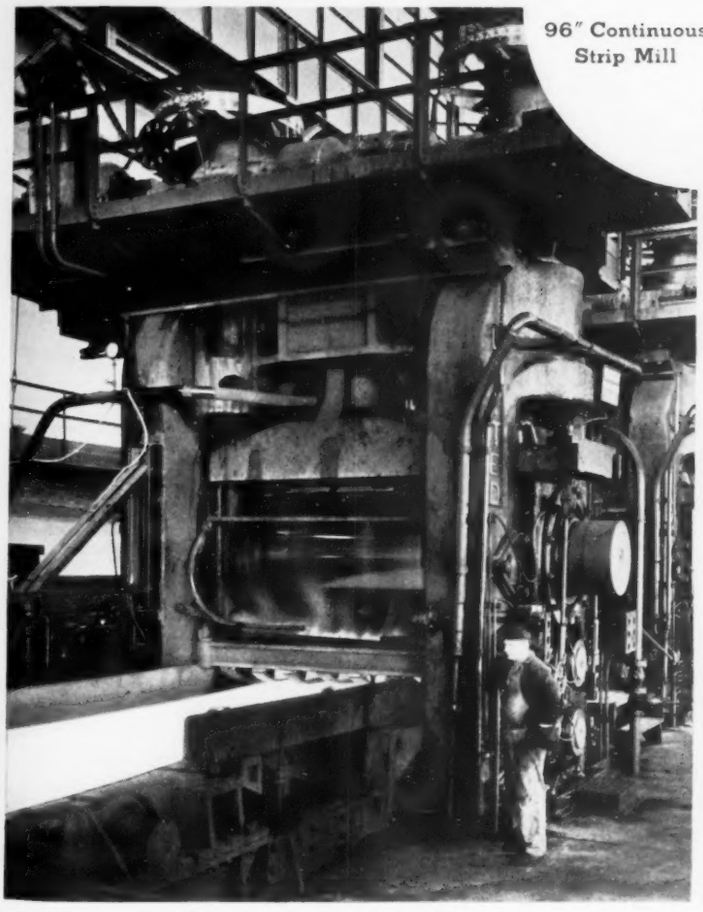

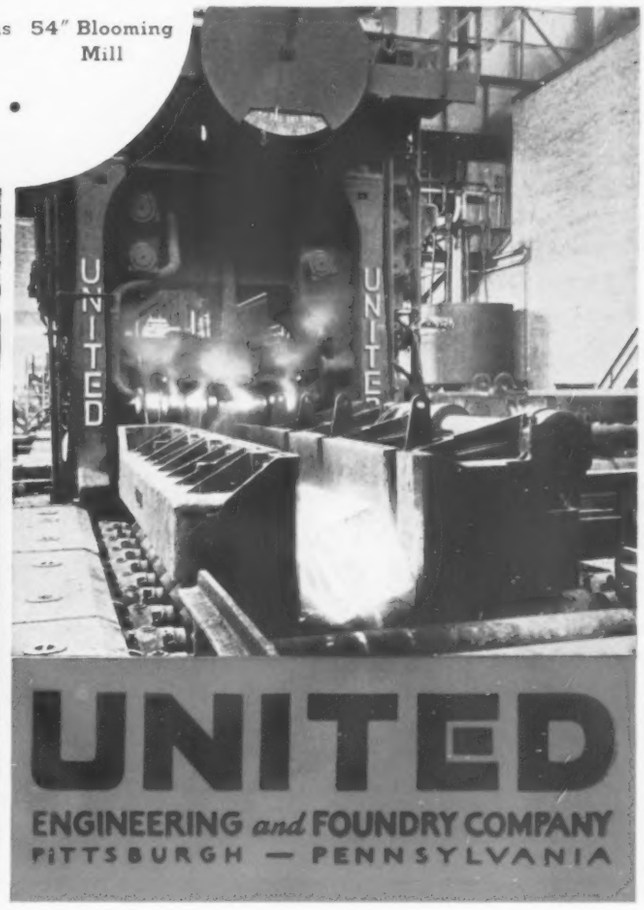

UNITED
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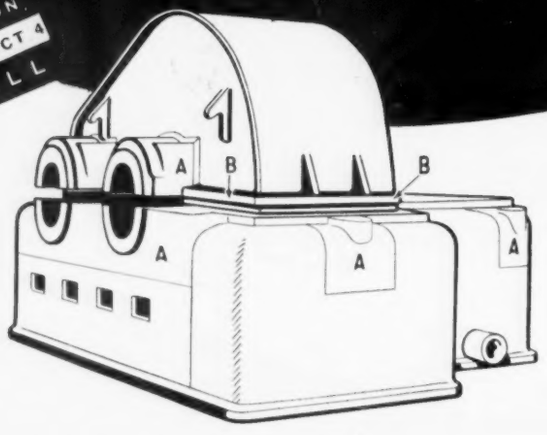
The why ★ the how

INTERNATIONAL
METAL EXPOSITION
CHICAGO • SEPT 30-OCT 4
NORTH HALL



Simplifying With Rolled Steel

● Here is a typical instance of the way in which rolled steel permits simplification of product and of production. Rolled steel plus simple castings plus welding save time and save money on big units like this and on small ones, too. Parts labeled A, are castings—B, are cold rolled steel to assure good surface. All other parts are rolled steel.

United States

★ the where of—

ROLLED STEEL CONSTRUCTION

● **"How can we apply rolled steel construction to our own products?" This question is asked with increasing frequency by many manufacturers who recognize the economy and the advantages of rolled steel for machine construction.**

What types of machinery lend themselves to the more extensive use of rolled steel? What savings are possible? How is weight affected? What production advantages are possible? What types and forms of steel are best suited? What should we know about buying? What are the opportunities for the use of rolled steel combined with castings?

The answers to these and to scores of other questions will determine the policy for a given product. You'll find those answers in a new booklet issued for your guidance.

YOU'LL FIND THE ANSWERS TO YOUR QUESTIONS IN THIS NEW BOOKLET

Send today for this booklet "Rolled Steel For Machine Construction." It was prepared by practical men . . . engineers and designers. It offers a short cut to a more complete understanding of the manifold advantages of rolled steel. And it includes many suggestions on economy in buying and on modern shop technique. A copy is yours for the asking . . . plus further information and the counsel of our representatives if you want it.

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FOUR IMPORTANT NEW DEVELOPMENTS

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AT THE

National Metal Exposition and Congress

CHICAGO, SEPT. 30 TO OCT. 4

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REDUCE COST OF MATERIAL BY USING COILS INSTEAD OF FLAT STRIP

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Welding Society Program Assures Heavy Attendance

AN ATTRACTIVE program has been arranged by the American Welding society for its fall meeting, which for the ninth consecutive year comprises an integral part of the National Metal congress. Activities of the organization will get under way on Monday afternoon at the Palmer House, where headquarters will be maintained throughout the week.

Upon convening Monday afternoon, the association will conduct a brief general session which will include an address of welcome, by President J. J. Crowe. This will be followed by award of the Samuel Wylie Miller memorial medal for meritorious achievement which has contributed conspicuously to the advancement of welding and cutting. The balance of the afternoon will be given to the first technical session.

Fundamental research in welding is the general subject for two technical sessions on the morning and afternoon of Tuesday. A conference for university research workers on fundamentals of welding has been arranged for the evening.

Symposium on Distortion

A general technical session will be held on Wednesday morning; but the meeting in the afternoon will be organized as a symposium on methods of minimum distortion, with several papers bearing on the subject.

The program for Thursday calls for a symposium in the morning on low alloy steels for welding purposes, a subject which is becoming increasingly important. A general session in the afternoon will conclude the technical portions of the meeting.

Social features include a stag entertainment on Wednesday night and a dinner-dance on Thursday night.

All day Friday will be given over to plant visitations. A choice of two trips will be offered as noted in the program.

The complete program is as follows:

Monday, Sept. 30

9:30 A. M.—PALMER HOUSE

Registration until 5:00 p. m.

1:45 P. M.—PALMER HOUSE

Opening Session

Introduction of president of American Welding society by D. C. Wright, consulting industrial and management engineer, Hammond, Ind., and chairman, Chicago section, American Welding society.

Address of welcome.

Presentation of Miller Memorial Medal award.

2:30 P. M.—PALMER HOUSE

Technical Session

"Bridge Welding—A Review of the Literature," by F. H. Frankland, American Institute of Steel Construction, New York, and vice chairman, committee to study welding of highway and railroad bridges.

"Nitrogen in Metallic Arc Weld Metal," by J. W. Miller, Reid-Avery Co., Philadelphia.

J. J. Crowe
President, American Welding Society

6:30 P. M.—PALMER HOUSE

Dinner meeting of board of directors.

Tuesday, Oct. 1

9:45 A. M.—PALMER HOUSE

Fundamental Research in Welding

"Spot Welding Problems," by J. H. Zimmerman, Massachusetts Institute of Technology, Cambridge, Mass.

"Bend Testing of Welds—A Summary," by M. F. Sayre, Union college, Schenectady, N. Y.

"Advantages of Welding in Continuous Structures," by Inge Lyse, Lehigh university, Bethlehem, Pa.

2:00 P. M.—PALMER HOUSE

Fundamental Research in Welding

"Arc Welding with Pure Iron Welds," by Gilbert E. Doan, Lehigh university, Bethlehem, Pa.

"Investigations of Residual Stresses," by R. G. Jamieson, McGill university, Montreal, Quebec.

"Tests to Determine the Feasibility of Welding the Steel Frames of Buildings for Complete Continuity," by W. M. Wilson, University of Illinois, Urbana, Ill.

"Creep Tests of Welds," by N. F. Ward, University of California, Berkeley, Calif.

7:30 P. M.—PALMER HOUSE

Conference and meeting of fundamental research committee, American bureau of welding. Chairman H. M. Hobart, consulting engineer, General Electric Co., Schenectady, N. Y., presiding. This conference is scheduled for assistance of university research workers in the fundamentals of welding.

Wednesday, Oct. 2

9:45 A. M.—PALMER HOUSE

Technical Session

"Welding All-Metal Radio Tubes," by W. H. Gibb, Thomson-Gibb Electric Welding Co., Lynn, Mass.

"A New General-Purpose Meter for Resistance Welding," by C. Stansbury, Cutler-Hammer Inc., Milwaukee.

"Fabricated Composite Dies," by K. Janiszewski, Superior Steel Products Co., Monaca, Pa.

2:00 P. M.—PALMER HOUSE

Symposium on Methods of Minimum Distortion

1—"Pressure Vessels," by J. T. Phillips, Foster Wheeler Corp., Carteret, N. J.

2—"Repair Welding," by George Hettrick, Anchor Welding Service Inc., Chicago.

3—"Light-Gage Steel," by J. H. Blaha, General Household Utilities Co., Chicago.

"Machine Torch Cutting and Fabrication of Tool Equipment," by P. H. Danly, Danly Machine Specialties Co., Chicago.

10:00 P. M.—PALMER HOUSE

Milwaukee Night

Stag entertainment.

Thursday, Oct. 3

9:45 A. M.—PALMER HOUSE

Symposium on Low Alloy Steels for Welding Purposes

"Development and Use of Low-Alloy, High-Tensile Steels in Welded Construction," by A. E. Gibson, Wellman Engineering Co., Cleveland.

"Welding of Alloy Steels," by H. L. Miller, Republic Steel Corp., Youngstown, O., J. C. Holmberg, Struthers-Wells-Titusville Corp., Warren, Pa., and Corbin Chapman, Hedges-Walsh-Weidner Co., Chattanooga, Tenn.

2:00 P. M.—PALMER HOUSE

Technical Session

"Welding of Alloy Steels," by J. C. Hodge, Babcock & Wilcox Co., Barberton, O.

"Effect of Generator Characteristics on the Weld," by J. H. Blankenbuehler, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Electrical Characteristics of the Welding Arc," by S. C. Osborne, Wilson Welder & Metals Co. Inc., North Bergen, N. J.

"Resistance Welding of Copper Alloys," by I. T. Hook, American Brass Co., Waterbury, Conn.

7:30 P. M.—PALMER HOUSE

Dinner-dance of American Welding society.

Friday, Oct. 4

MORNING AND AFTERNOON

Inspection trips. Choice of two routes to plants in south and southwestern

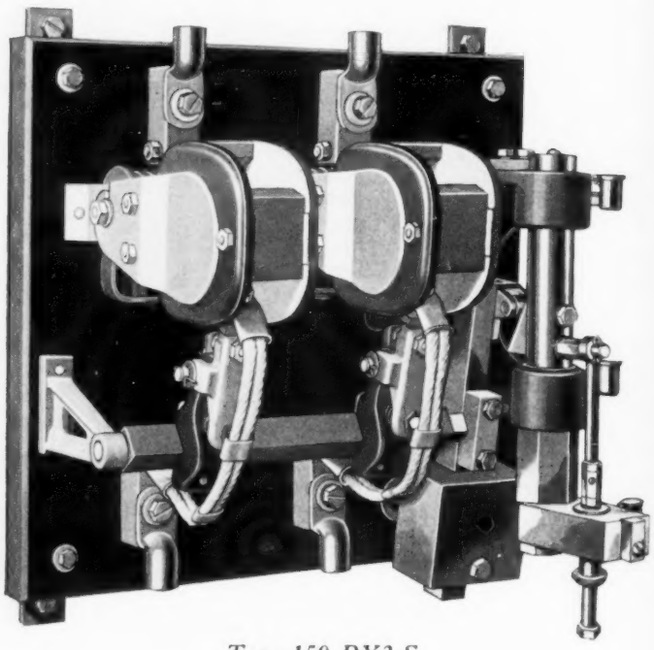
(*Please turn to Page* 122)

Air Control!

—AND TIMING—

without

1 Pressure Switch
2 Magnet
3 Tubes - Condensers
4 Relays
5 Gadgets
6 Complicated Circuits



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Most Simple—Most Accurate Spot Welder Control Made. Can be connected directly to Air-Operated Welder without Pressure Switch.

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Clutch Plate

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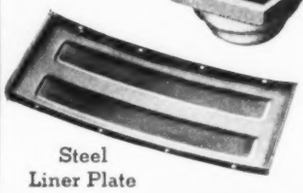
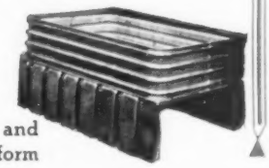

Steel Liner Plate

Washing Machine Tub

Cross Member

Steel Beer Barrels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Why – REPUTATION COUNTS

Our good reputation is more valuable to us than our plant – our equipment or our other physical properties. For upon it rests our future success. Therefore, whatever requirement a customer may present to us – need for expert advice, engineering service, character of finished product or exceptional speed in delivery – it immediately becomes subject to our first objective. That objective always is to increase the good estimate which he holds of us. Having motivated our every action for over thirty years, Truscon will never alter it.

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TRUSCON STEEL COMPANY

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by Cambridge

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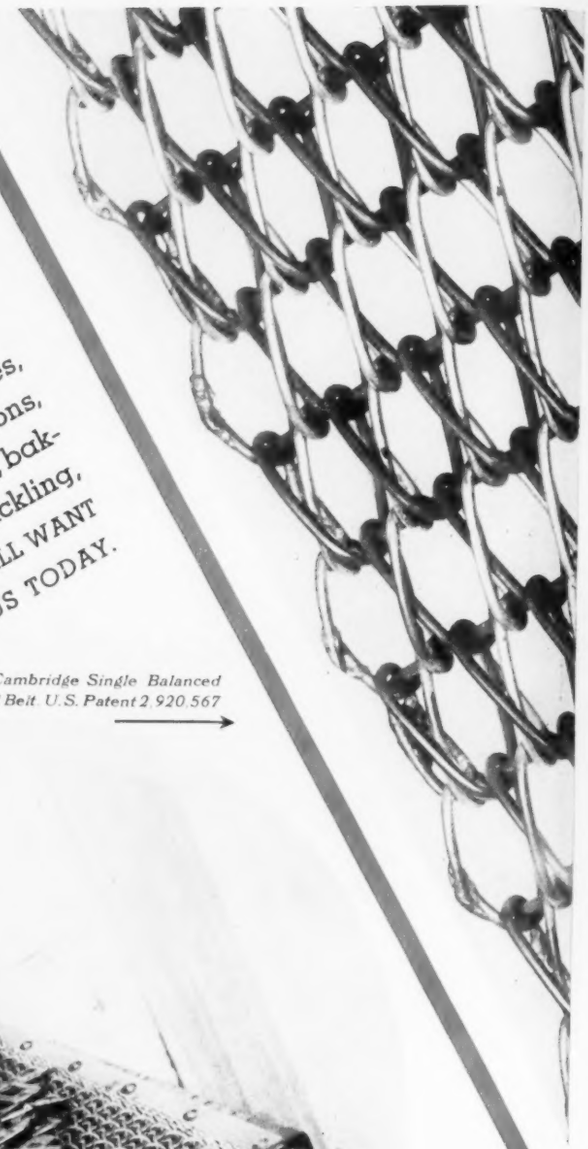
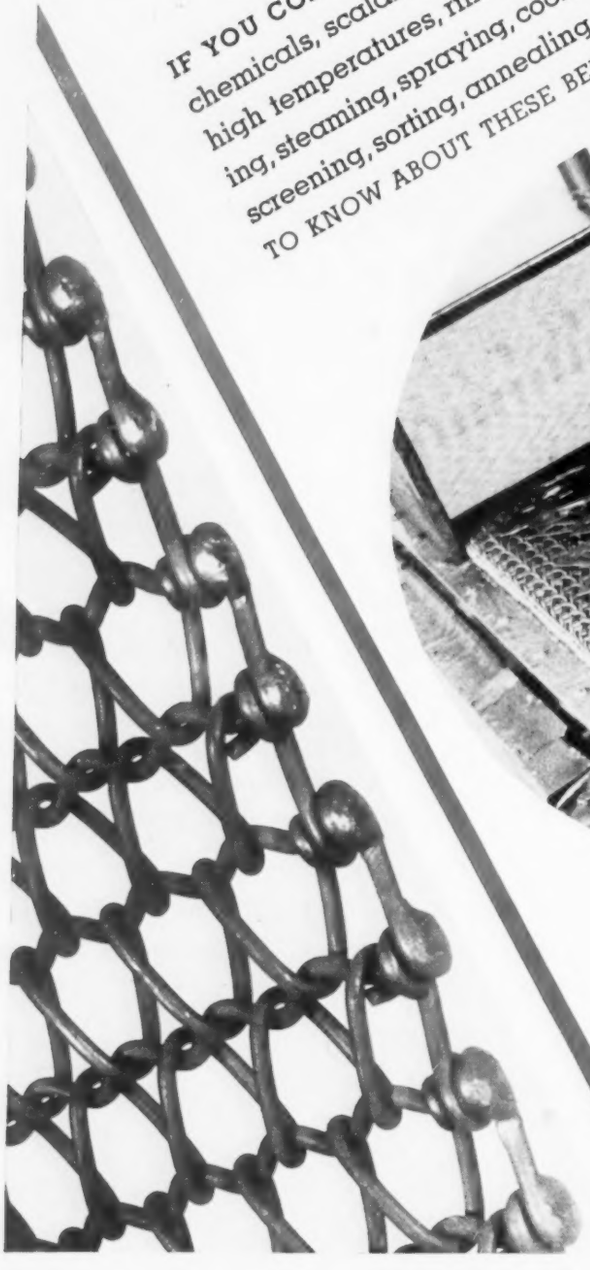


The Cambridge Single Balanced Spiral Belt. U.S. Patent 2,920,567



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*Above is installation showing the Cambridge Single Balanced Belt conveying metal parts thru an annealing process.

The Cambridge Double Balanced Spiral Belt. U.S. Patent 1,888,275

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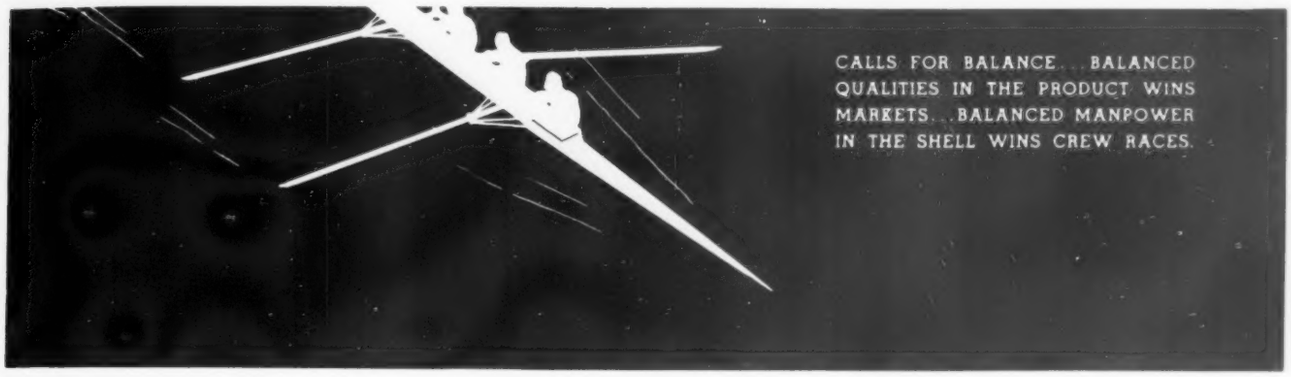
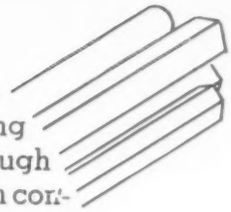
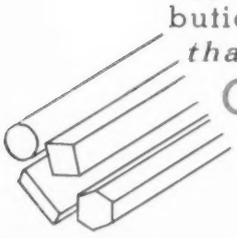


BALANCE



in a product means fine workmanship plus adequate stocks plus efficient distribution. Moltrup is winning the market of careful steel buyers through strict attention to this balance, and through constant effort toward improvement along the three important fronts of CRAFTSMANSHIP—TONNAGE—SERVICE.

Moltrup craftsmanship produces fine finish cold drawn steel of extreme accuracy. Moltrup foresight produces steel in sufficient tonnages to supply every need. And Moltrup dealer distribution offers *immediate steel service that is second to none in the world.*



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MOLTRUP

Metals Topics Will Engage Two A.I.M.E. Divisions

CONTINUING the participation of the American Institute of Mining and Metallurgical Engineers in the National Metal congress, the Iron and Steel division and the Institute of Metals division will conduct their fall meetings in Chicago, Oct. 1-3. Both divisions have arranged comprehensive and attractive programs. Headquarters will be maintained at the Palmer House.

Although technical sessions will not begin until Tuesday morning, Oct. 1, registration will get under way on the preceding day. In most cases, sessions of the two divisions will be conducted simultaneously. At its opening meeting on Tuesday morning, the Iron and Steel division will give attention to blast furnaces and raw materials; at the second session in the afternoon, to be conducted as a roundtable, the subject will be qualities of pig iron.

A. B. Kinzel

Chairman, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers

The morning session of the Institute of Metals will be concerned with the constitution of alloys and the afternoon session to reactions in alloys, principally nonferrous.

Executive committees of the two divisions will hold separate luncheon meetings at the Palmer House Wednesday noon. No sessions will be held in the morning to permit members to hear the Campbell memorial lecture of the American Society for Metals.

Wednesday afternoon sessions of the two divisions will be at the International Amphitheatre; the Iron and Steel division devoting its attention to general subjects and the Institute of Metals considering gas-metal systems.

The two divisions meet jointly for the annual dinner at the Palmer House on Wednesday evening. "Metallurgy in Norway" is the subject of an address to be presented by Carl W. Volz, Norwegian Smelting Works, Electric Furnace Products Co.

Institute of Metals has scheduled no sesssions for Thursday, but the Iron and Steel division will hold sessions morning and afternoon discussing temperature measurements of liquid iron and steel.

Join for Science Lecture

Activities of the A.I.M.E. will be concluded late Thursday afternoon when the two divisions will meet jointly for the science lecture to be presented by Harold Clayton Urey, professor of chemistry, Columbia university. His subject is "Recent Developments in Isotopic Chemistry."

Detailed programs for the two divisions are as follows:

Monday, Sept. 30

10:00 A. M.—PALMER HOUSE

Registration until 5:00 p. m.

Tuesday, Oct. 1

10:00 A. M.—PALMER HOUSE

Iron and Steel Division

Blast Furnaces and Raw Materials

"Production and Preparation of Blast Furnace Flux," by Paul C. Hodges.
"Blast Furnace Air Blast Beneficiation," by Theodore Nagel.
"Five Years of Progress in Southern Merchant Iron Production," by Francis H. Crockard.
"Beneficiation of Michigan Iron Formations," by Frank J. Tolonen.

10:00 A. M.—PALMER HOUSE

Institute of Metals

Constitution

"An Investigation of the Zinc-Rich Portion of the System Iron-Zinc," by E. C. Truesdale, R. L. Wilcox and J. L. Rodda.
"Influence of Lattice Distortion on Diffusion in Metals," by V. G. Mooradian and John T. Norton.
"A Study of the Molybdenum-Carbon System," by W. P. Sykes, Kent R. Van Horn and C. M. Tucker.

2:00 P. M.—PALMER HOUSE

Iron and Steel Division

Roundtable on Qualities of Pig Iron

This session will constitute a general discussion without formal papers.

2:00 P. M.—PALMER HOUSE

Institute of Metals

Reactions in Alloys

"Studies of Phase Changes During Aging of Zinc-Alloy Die Castings, II—Changes in the Solid Solution of Aluminum in Zinc and Their Relation to Dimensional Changes," by M. L. Fuller and R. L. Wilcox.
"Quenching Stresses and the Precipitation Reaction in Aluminum-Magnesium Alloys," by R. M. Brick, Arthur Phillips and A. J. Smith.
"Notes on the Crystallization of Copper," by Alden B. Greninger.

Wednesday, Oct. 2

12:30 P. M.—PALMER HOUSE

Iron and Steel Division

Luncheon meeting of executive committee.

12:30 P. M.—PALMER HOUSE

Institute of Metals

Luncheon meeting of executive committee.

2:00 P. M.—INTERNATIONAL AMPHITHEATRE

Iron and Steel Division

General Session

"Initial Stages of the Magnetic and Austenitic Transformations in a Carbon Steel," by I. N. Zavarine.
"Notes on the Origin and Growth of Graphite Nuclei in Solid and Liquid Iron Solutions," by H. A. Schwartz and Wolfram Ruff.
"Separation of Hematite by Means of Hysteretic Repulsion," by E. W. Schilling and Harwick Johnson.

2:00 P. M.—INTERNATIONAL AMPHITHEATRE

Institute of Metals

Gas-Metal Systems

"Reduction of Chromic Oxide by Hydrogen," by F. C. Kelley.

(*Please turn to Page* 122)

W. M. Peirce

Chairman, Institute of Metals Division, American Institute of Mining and Metallurgical Engineers

The RIGHT STEEL *for* EVERY PURPOSE

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For nearly a century, Ryerson has been meeting the steel requirements of industry. Ten complete plants carry the world's largest and most diversified stocks, making it easy to concentrate purchases through one dependable source, saving time and money. Draw on these stocks —you are sure to find the kind and quality of steel you require, in a full range of sizes. You can count on personal attention for every order —with quick shipment assured.

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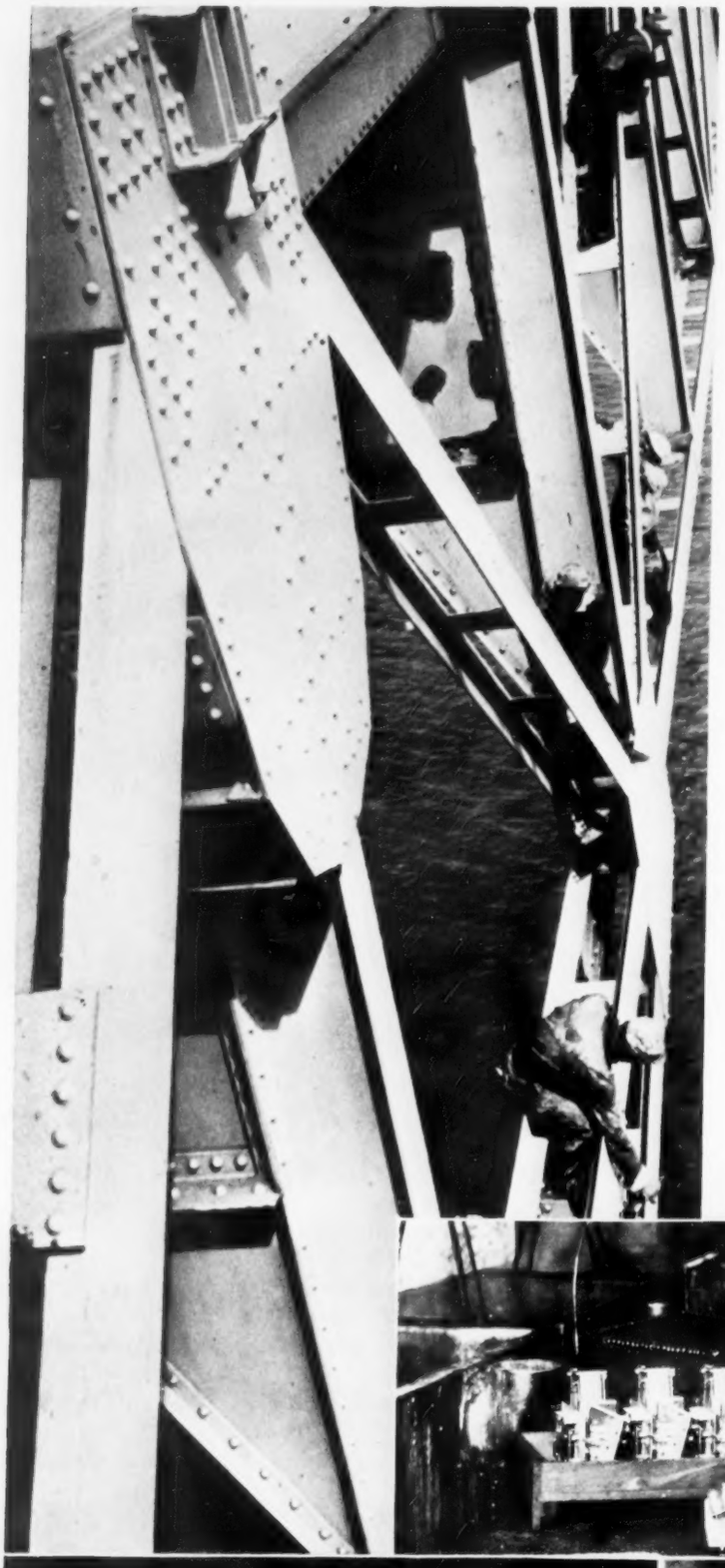

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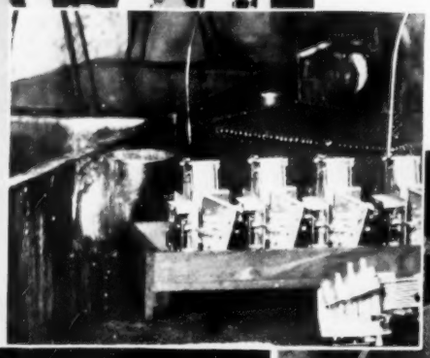
Our sales engineers will help you work out effective and economical rust prevention in your own plant.



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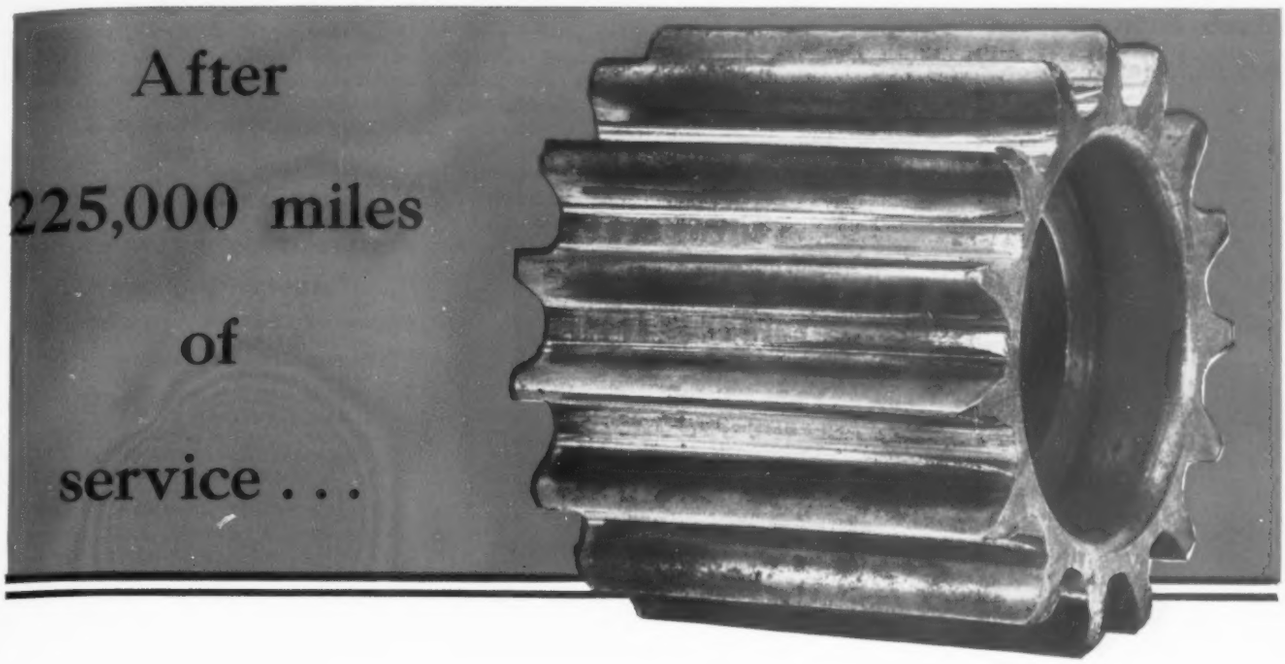

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We are always ready to discuss your steel problems, particularly the difficult ones where exceptionally severe service is involved.

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Chicago
September 30 to October 4

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FERRO-ALLOYS
of vanadium, silicon, chromium, titanium, and silico-manganese, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

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VANADIUM STEELS

for strength, toughness and durability

Metals Topics Will Engage Two A.I.M.E. Divisions

(*Concluded from Page* 118)

"Solubility of Oxygen in Solid Cobalt and the Upper Transformation Point of the Metal," by A. U. Seybolt and C. H. Mathewson.

"Thermal and Electrical Conductivities of Copper Alloys," by Cyril Stanley Smith and Earl W. Palmer.

"An Apparatus for Determining Creep in Single Crystals," by R. F. Miller.

6:30 P. M.—PALMER HOUSE

Iron and Steel and Institute of Metals Divisions

Annual dinner. Speaker: Carl W. Volz, Norwegian Smelting Works, Electric Furnace Products Co.; subject: "Metallurgy in Norway."

Thursday, Oct. 3

9:30 A. M.—PALMER HOUSE

Iron and Steel Division

Temperature Measurements of Liquid Iron and Steel

"Some Metallurgical Applications of the Fitterer Pyrometer," by G. R. Fitterer.

"Temperature Measurements with the Disappearing-Filament Optical Pyrometer," by W. E. Forsythe.

2:00 P. M.—PALMER HOUSE

Iron and Steel Division

Temperature Measurements of Liquid Iron and Steel

Continuation of the morning session.

4:00 P. M.—PALMER HOUSE

Iron and Steel and Institute of Metals Divisions

Science Lecture

"Recent Developments in Isotopic Chemistry," by Harold Clayton Urey, professor of chemistry, Columbia university, New York.

Officers of the Iron and Steel division are as follows: Chairman, A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories Inc., New York; past chairman, L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O.; vice chairman, John Howe Hall, metallurgical engineer, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.; vice chairman, J. T. MacKenzie, metallurgist and chief chemist, American Cast Iron Pipe Co., Birmingham, Ala.; vice chairman, C. E. Williams, director, Battelle Memorial institute, Columbus, O.; and secretary, F. T. Sisco, editor, Alloys of Iron Research, New York.

The executive committee is comprised of: F. B. Foley, superintendent of research, Midvale Co., Philadelphia; J. H. Nead, chief metallurgist, Inland Steel Co., East Chicago, Ind., F. B. Richards, Cambridge, Mass.; A. V. deForest, associate professor of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass.; H. W. Graham, general metallurgist, Jones & Laughlin Steel Corp., Pittsburgh; F. C. Langenburg, United States Cast Iron Pipe & Foundry Co., Burlington, N. J.; E. C. Bain, assistant to vice president in charge of research, United States Steel Corp., New York; E. C. Smith, chief metallurgist, Republic Steel Corp., Youngstown, O.; and Bradley Stoughton, consulting metallurgist, Lehigh university, Bethlehem, Pa.

Officers of the Institute of Metals division are: Chairman, W. M. Peirce, assistant to chief of research, research division, New Jersey Zinc Co., Palmerton, Pa.; past chairman, J. L. Christie, metallurgist, Bridgeport Brass Co., Bridgeport, Conn.; vice chairman, E. H. Dix Jr., metallurgist, aluminum research laboratories, Aluminum Co. of America, New Kensington, Pa.; vice chairman, A. J. Phillips, superintendent of research, central research laboratory, American Smelting & Refining Co., Maurer, N. J.; secretary, E. M. Wise, metallurgist, International Nickel Co. Inc., Bayonne, N. J.; and treasurer, W. M. Corse, consulting metallurgist, Washington.

Executive committee members are: W. H. Bassett Jr., technical superintendent and metallurgist, Anaconda Wire & Cable Co., Hastings-on-the-Hudson, N. Y.; D. K. Crampton, director of research, Chase Companies Inc., Waterbury, Conn.; J. A. Gann, metallurgist, Dow Chemical Co., Midland, Mich.; G. O. Hiers, metallurgist, research laboratories, National Lead Co., Brooklyn, N. Y.; R. H. Leach, mining engineer, Handy & Harman, Bridgeport, Conn.; R. F. Mehl, director, metals research laboratories, Carnegie Institute of Technology, Pittsburgh; W. E. Remmers, metallurgical engineer, Western Electric Co., Chicago; H. J. Roast, technical advisor, Canadian Bronze Co. Ltd., Montreal, Que.; and Jerome Strauss, chief research engineer, Vanadium Corp. of America, Bridgeville, Pa.

STEEL at the Metal Show

THROUGHOUT the National Metal exposition, STEEL will maintain headquarters in Booth E-34, which will be outfitted as a restroom for the convenience of visitors. Publications of the Penton Publishing Co., including STEEL, *Daily Metal Trade*, *The Foundry*, *Abrasive Industry* and *Machine Design*, will be available here. Representatives of the editorial staff of STEEL will include E. L. Shaner, editor; E. F. Ross, associate editor; J. D. Knox, associate editor; A. H. Allen, associate editor; and W. G. Gude Jr., associate editor in Chicago. The business staff will be represented by G. O. Hays, business manager; John Henry, advertising manager; R. C. Jaenke, advertising representative; and L. C. Pelott, western manager in Chicago. The Penton Publishing Co. will be represented by C. J. Stark, president; and J. D. Pease, executive vice president.

Welding Society Program Assures Heavy Attendance

(*Concluded from Page* 113)

sections of Chicago. Among plants to be visited are:

International Harvester Co. (Tractor Works).
Lasker Boiler & Engineering Corp.
John Mohr & Sons.
Illinois Steel Co. (South Works).
Pullman-Standard Car Mfg. Co.
S. A. Healy Co.

Officers of the American Welding society are: President, J. J. Crowe, engineer in charge of apparatus research and development, Air Reduction Co., Jersey City, N. J.; senior vice president, E. R. Fish, chief engineer, boiler division, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.; treasurer, C. A. McCune, secretary, Magnaflux Corp., New York; and secretary, M. M. Kelly, 33 West Thirty-ninth street, New York.

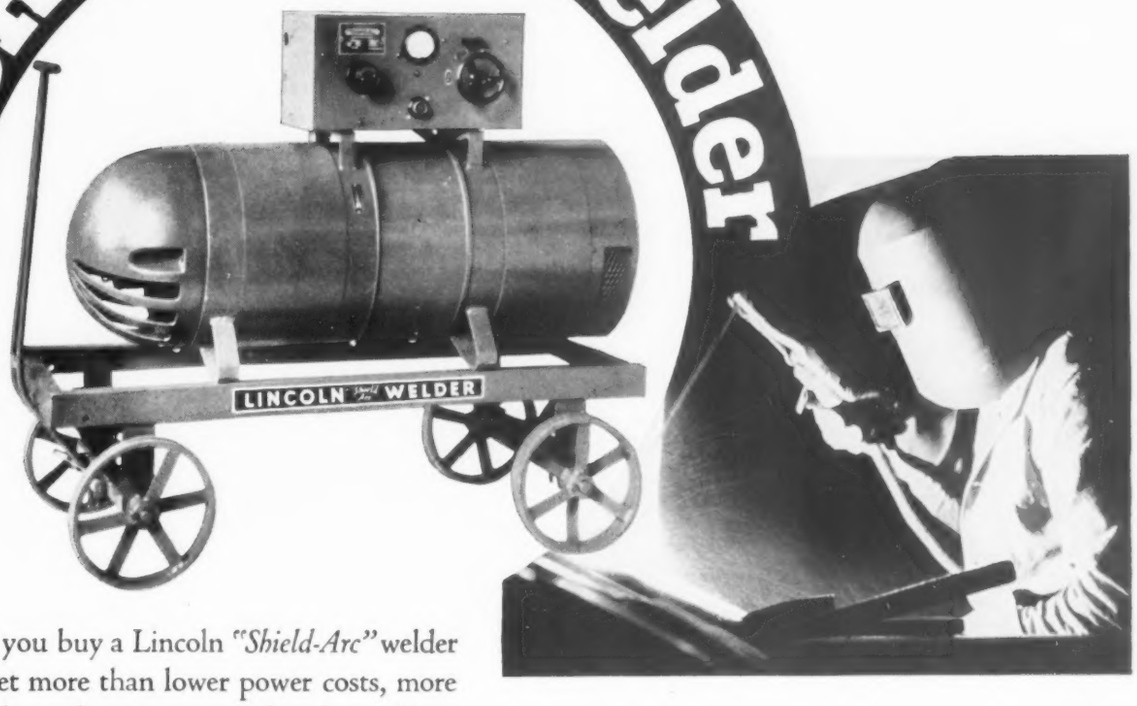
Divisional vice presidents are: New York and New England, A. G. Leake, president, Leake & Nelson Co., Bridgeport, Conn.; Pacific Coast, T. C. Smith, designing engineer, General Petroleum Corp. of California, Los Angeles; Middle Eastern, W. W. Reddie, manager, welding section, industrial department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; C. L. Eksergian, chief engineer, Budd Wheel Co., Detroit; and Southern Division, E. E. Dillman, Wyatt Metal & Boiler Works, Dallas, Tex.

The American Bureau of Welding, organized simultaneously with the American Welding society in 1919, to serve as the research branch of the society, was reorganized during the past year owing to the fact that the National Research council found it no longer possible to sponsor the work of the bureau and to contribute to its support as it has in the past. Sponsorship of the bureau has therefore been taken over by the society, substituting in its place a welding research committee with the same status as other standing committees.

C. A. Adams, professor, Harvard Engineering school, Harvard university, Cambridge, Mass., served as director of the American Bureau of Welding, and W. Spraragen, president, Spraragen Engineering Corp., New York, as secretary. Both have rendered long and valuable service.

Membership in the American Welding society reached a new all-time high during the past year with a total over 1600.

MORE than a Welder



WHEN you buy a Lincoln *"Shield-Arc"* welder you get more than lower power costs, more than lower electrode costs, more than lower labor costs, more than highest quality welding.

At no extra cost you share in many other important advantages which only users of Lincoln welders can receive.

For example, you share the advantages of Lincoln's quarter century accumulation of arc welding knowledge, pioneering leadership in development of improved arc welding equipment, expert assistance in welding engineering, guidance in redesigning for arc welding, consultation on any arc welding problem, instruction in all phases of practical arc welding.

That's why we say *"Shield-Arc"* means more than a welder. And that's why there are more Lincoln welders in use than any other make.

If it is your responsibility to get every last cent's worth of value for each dollar your company spends on welding equipment, we suggest you find out how much more Lincoln gives you. Mail the coupon today to THE LINCOLN ELECTRIC COMPANY, Dept. Y-178, CLEVELAND, OHIO. Largest Manufacturers of Arc Welding Equipment in the World. Mail coupon today.

POP: "What woman was it, who said, 'It ain't the men in your life that count, it's the life in your men'."

LAD: "Let's talk about welding, Pop. Lincoln says it takes more than a good welder to get all the profits arc welding offers. That's why they give us so much more than the *'Shield-Arc'*."

SEE *"SHIELD-ARC"* IN ACTION
National Metal Exposition, Booth H-3, Chicago, Sept. 30—Oct. 4.

THE LINCOLN ELECTRIC CO., Dept. Y-178, Cleveland, O.

Gentlemen: Please send full particulars on *"Shield-Arc"* welding.
I now weld with (check which) ☐ electric arc ☐ gas ☐ none

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in 108 distinct series

To the machinery world, NORMA-HOFFMANN offers the most complete and comprehensive line of anti-friction bearings in America—108 distinct series—a PRECISION Bearing for every load, speed and duty.

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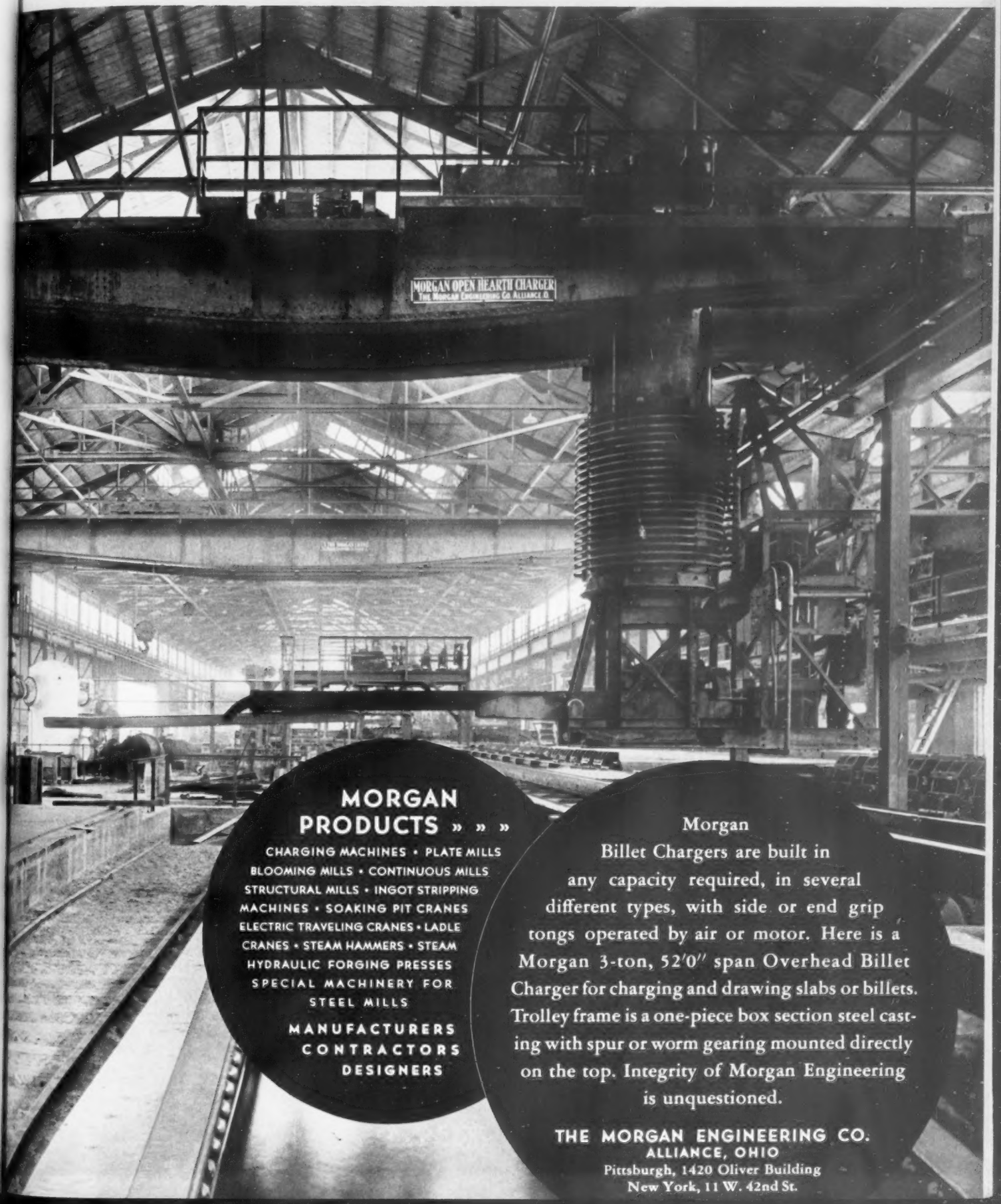

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Papers on Wire Association Program Appear Attractive

SIX technical sessions, a business meeting, and a dinner will comprise the program for the annual meeting of the Wire association, which is holding its convention in connection with the National Metal congress for the fourth consecutive year. The association has named the Congress hotel as its headquarters.

The technical sessions commence on Tuesday morning, Oct. 1, and will continue through Thursday, Oct. 3, with morning and afternoon meetings. Registration starts on Monday morning, Sept. 30, at which time members and guests will congregate informally. In the afternoon, the board of directors will convene, their meeting to be followed by the association's annual business session.

Acid cleaning and material handling of rod and wire will be discussed in two papers at the Tuesday morning session; subjects to be touched upon at the afternoon session are copper wire, electrolytic copper and dies. Grain size influence on the manufacture of wire will be the theme for the two sessions on Wednesday, the morning session dealing with steel wire and the afternoon session with copper wire.

Relations with the Customer

Thursday morning's session will be directed to cold heading and tests and testing; while in the afternoon a single paper and extensive discussions will deal with the important subject of customer relations.

New this year in the association's convention program is the informal dinner to be served on Wednesday evening. The guest speaker will present an address on industrial relations in the wire industry. Included also in the program following the dinner will be the award of the Wire association medal. This medal is presented for meritorious service or achievement in connection with wire making.

The detailed program of the Wire association is as follows:

Monday, Sept. 30

CONGRESS HOTEL

MORNING

Registration.

AFTERNOON

Meeting of board of directors.
Annual meeting of Wire association.

Tuesday, Oct. 1

9:30 A. M.—CONGRESS HOTEL

Acid Cleaning—Material Handling of Rod and Wire

"Acid Cleaning and Material Handling of Rods and Wire," by Frederick A. Westphal, superintendent of wire mill, Sheffield Steel Co., Kansas City, Mo.

"Modern Acid Handling Methods Lower Pickling Costs," by J. R. Hoover, assistant manager, chemical sales division, B. F. Goodrich Co., Akron, O.

2:00 P. M.—CONGRESS HOTEL

Copper Wire — Electrolytic Copper — Dies

"Hard and Soft Copper Wire," by Rudolph A. Schatzel, superintendent, general research laboratories, General Cable Corp., Rome, N. Y.

"Notes on the Use of Back Pull in Wire Drawing," by Paul M. Mueller, engineer, Revere Copper & Brass Inc., New York.

"Electrolytic Copper," a discussion.

John Mordica
President, Wire Association

Wednesday, Oct. 2

9:30 A. M.—CONGRESS HOTEL

Grain Size Influence on Manufacturing of Steel Wire

"Grain Size and Its Influence on the Manufacture of Steel Wire," by B. L. McCarthy, metallurgist, Wickwire Spencer Steel Co., Buffalo.

2:00 P. M.—CONGRESS HOTEL

Grain Size Influence on Manufacturing of Copper Wire

"Effect on the Physical Properties of Bending Copper Wire of Different Grain Sizes," by L. B. Barker, works laboratories, and C. A. Bailey, in charge of wire department section, works laboratories, General Electric Co., Schenectady, N. Y.

8:00 P. M.—CONGRESS HOTEL

Informal Dinner

Address: "Industrial Relations as Applied to the Wire Industry," by E. W. Kempton, director of industrial relations, American Steel & Wire Co., Cleveland.
Award of the Wire association medal.

Thursday, Oct. 3

9:30 A. M.—CONGRESS HOTEL

Cold Heading—Tests and Testing

"Cold Heading Wire," by Leroy D. Seymour, metallurgist, rod and wire department, Youngstown Sheet & Tube Co., Youngstown, O.

"Tests and Testing," by C. A. Kellogg, metallurgist, Continental Steel Corp., Kokomo, Ind.

2:00 P. M.—CONGRESS HOTEL

Customer Relations Session

"Save on Wire by Proper Ordering," by Kenneth Murray, wire sales division, Republic Steel Corp., Chicago.

"Customer Relations," an open discussion.

The Wire association is a nonprofit organization of wire mill executives, superintendents and foremen. It also includes plant engineers, traffic men, credit men, salesmen, and all others engaged in the wire industry, as well as manufacturers and other interests offering products or services to wire manufacturers.

Membership in the association comprises over 200 of the most representative production executives of the industry, whose companies account for approximately 80 per cent of the country's output.

Direct Association's Activities

Officers of the Wire association are: President, John Mordica, superintendent, rod and wire works, Bethlehem Steel Co., Sparrows Point, Md.; vice president, L. D. Granger, assistant to vice president, Wickwire Spencer Steel Co., New York; vice president, E. W. Clark, managing engineer, wire department, General Electric Co., Schenectady, N. Y.; and secretary, Richard E. Brown, publisher, *Wire and Wire Products*, 17 East 42nd street, New York.

The board of directors is composed of the officers and the following: C. S. Barningham, sales manager, New England Butt Co., Providence, R. I.; John C. Callaghan, works manager, Canada works, Steel Co. of Canada, Hamilton, Ont.; Ralph K. Clifford, general superintendent, Continental Steel Corp., Kokomo, Ind.; Paul R. Fast, plant superintendent, Belden Mfg. Co., Chicago; E. P. Kastien, Peoria, Ill.; M. A. Kent, assistant general works manager, General Cable Corp., White Plains, N. Y.; W. D. Pierson, secretary, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; J. C. Ward Jr., assistant to president, United Aircraft Corp., East Hartford, Conn.; and F. A. Westphal, superintendent of wire mills, Sheffield Steel Corp., Kansas City, Mo.

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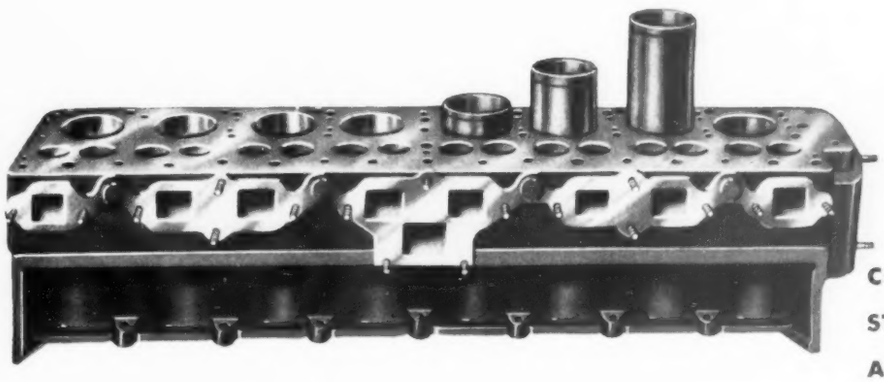

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(Please turn to Page 132)

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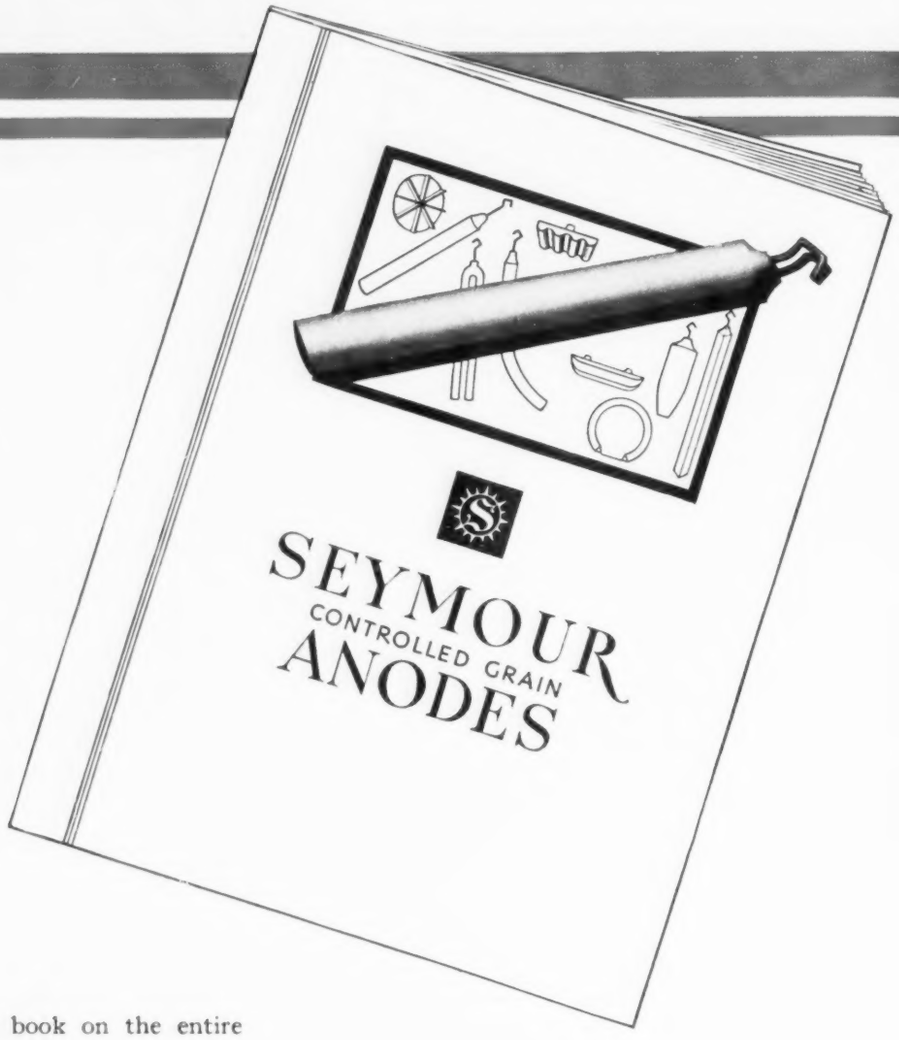

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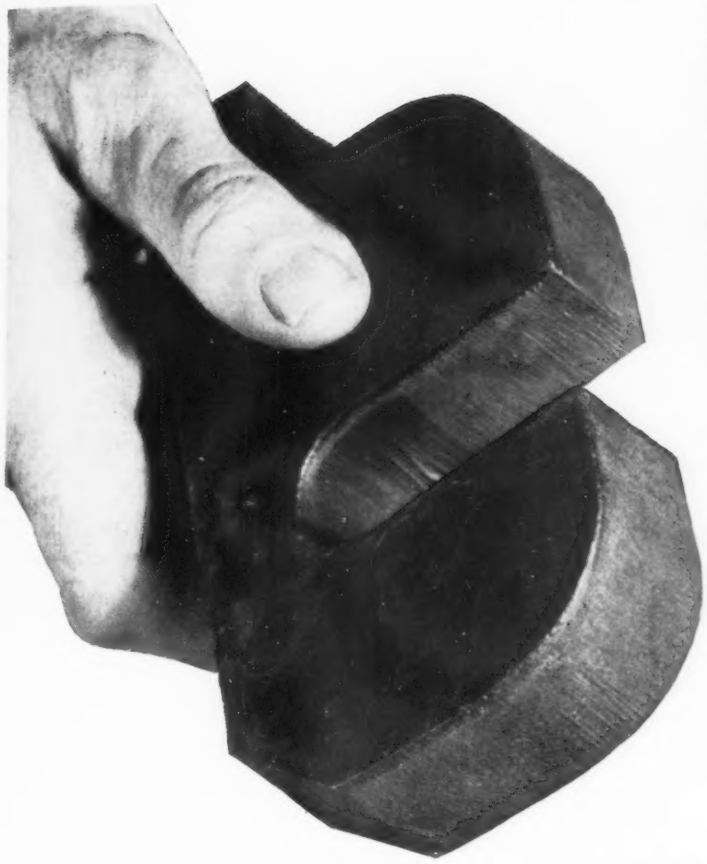

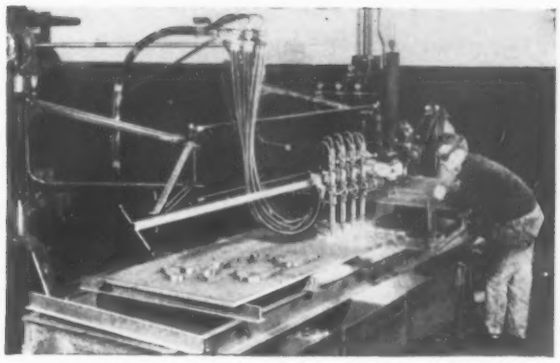

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D

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I

Illinois Steel Co., Chicago E-16
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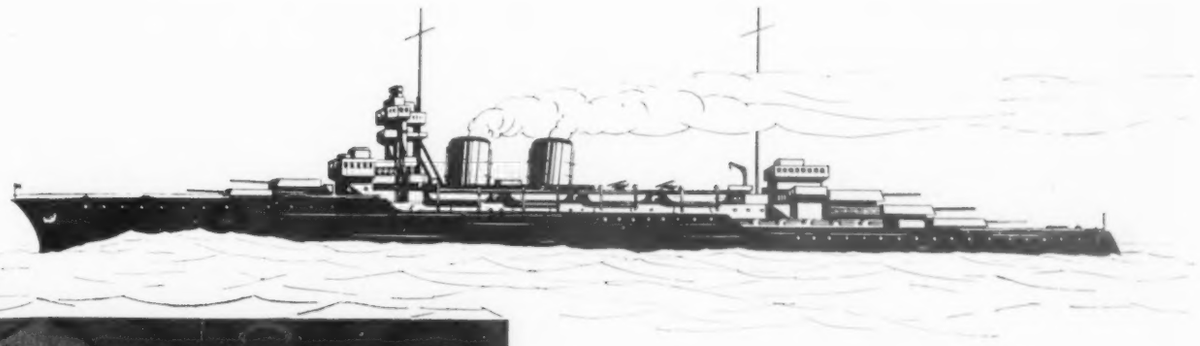
Pyrometers; thermometers; thermocouples; meters.

(*Please turn to Page* 136)



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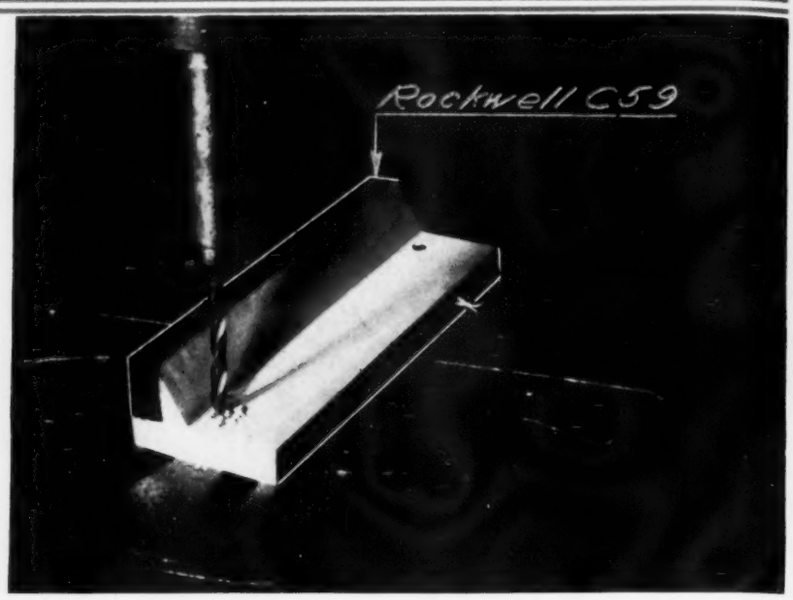
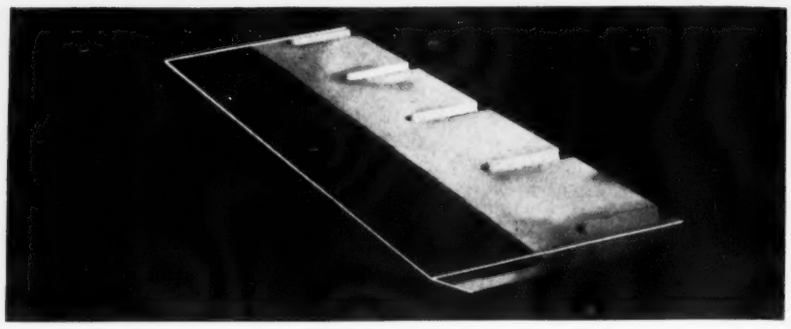




COMPOSITE STEELS

PATENTS PENDING

Above Left: SILVERBOND Composite Stainless Iron or Steel in which the unique web-like structure eliminates any possibility of separation of the component parts. Available in bar, plate, sheet, strip and shapes . . . The Jessop Steel Company also manufactures a complete line of fine Tool Steels, Saw Steels, Stainless Steels and Alloy Steels.

Upper Right:

COMPOSITE DIE STEEL

L-shaped section having high quality Electric Furnace tool steel backed by tough, non-hardenable carbon steel. Available with water or oil hardening inserts in all standard sizes.

Lower Right:

COMPOSITE TOOL STEELS

Sheet and bar stock of two types—(1) **BLUE STRIPE**—high carbon insert tool steel. (2) **RED STRIPE**—high carbon tungsten general purpose inserted alloy. Especially recommended.

Write us for further particulars on how you can lower your initial costs and how, in many instances, you can secure increased production.

Space N-11-A
National Metal
Congress, Sept.
30th—Oct. 4th.

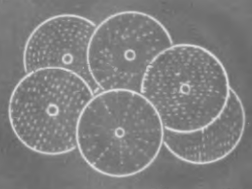
JESSOP STEEL COMPANY

Main Office and Works **— Washington, Penna.**

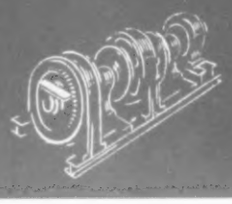
Branches: Hartford, New York, Philadelphia, Cleveland, Detroit, Cincinnati, Chicago and Toronto.

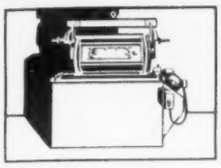
Special Representatives: Edgar T. Wards Sons, Inc.—with warehouses in all principal cities. Quality Steels, Inc., Dayton, Ohio. Schrock & Squires, Inc., New York, N. Y.

EVERYTHING for the PLATING PLANT

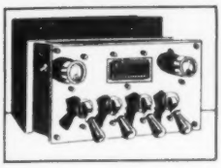


from BUFFS to GENERATORS

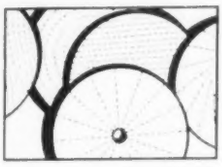




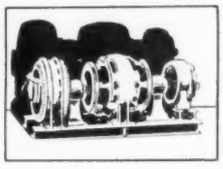
PLATING BARRELS *—sturdy, efficient, high-production units —made in variety of sizes and types.*



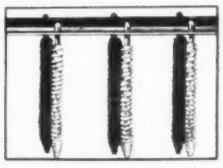
RHEOSTATS *—provide accurate current regulation—simply and easily operated.*



BUFFS *—any size, any type, any sewing— also polishing wheels, buffing compositions.*



GENERATORS *—famous "Chandeysson" make—dependable source of low-voltage, D.C. current.*



BALL ANODES *—copper, cadmium, zinc —improve plating efficiency and eliminate scrap losses.*

For all plating processes . . . for every need of the plating plant . . . Udylite has a complete line of equipment and supplies.

Whether you are in the market for a few buff sections or a 50,000 ampere generator . . . Udylite can supply you with products that set new standards for quality at competitive prices.

The nearest Udylite office will give you prompt and efficient service.

THE UDYLITE COMPANY

Suppliers to the Polishing and Plating Industry

1651 East Grand Blvd., Detroit, Mich.

NEW YORK 30 E. 42nd St. ★ CHICAGO 1943 Walnut St. ★ CLEVELAND 708 Keith Bldg. ★ SAN FRANCISCO 114 Sansome St.

Exhibitors in National Metal Exposition (Continued from p. 132)

Industrial Gas Engineering Co. I-21
Industrial drying equipment.

Ingersoll Steel & Disc Co., Chicago L-3
Stainless steels; clad metals.

International Nickel Co. Inc., New York.....E-2
Nickel and nickel alloys.

J

Janette Mfg. Co., Chicago N-2
Electric pumps and motors.

C. O. Jelliff Mfg. Corp., Southport, Conn. M-33
Heat-resisting alloys; resistance wire.

Jessop Steel Co., Washington, Pa. N-11A
Alloy steels; stainless steels; composite strip.

Johns-Manville, New York L-12
Insulating materials; refractory cements; packings.

Jones & Laughlin Steel Corp., Pittsburgh.....D-11
Hot and cold rolled steels; screw stock; S.A.E. steels.

K

J. W. Kelley Co., Cleveland K-30
Heat treating products; industrial oils; drawing compounds.

Kelley-Koett Mfg. Co. Inc., Covington, Ky. F-5
Metallurgical X-ray equipment.

C. M. Kemp Mfg. Co., Baltimore J-31
Gas premixers; burners.

Kloster Steel Corp., Chicago A-19
Tool steels; alloy steels; tool and dies.

James M. Kobabe Co., Chicago G-28
Gas burners.

L

K. O. Lee & Son Co., Aberdeen, S. D. K-23
Motor tools.

Leeds & Northrup Co., Philadelphia.....E-42
Heat treating furnaces; pyrometers; control instruments.

E. Leitz Inc., New York L-24
Microscopes; optical instruments; dilatometers; grinding and polishing machines.

Lincoln Electric Co., Cleveland H-3
Electric arc welding equipment; welding supplies.

Lindberg Engineering Co., Chicago J-8
Heat treating furnaces; pot furnaces; control equipment.

Lindberg Steel Treating Co., Chicago I-7
Heat treating equipment.

Linde Air Products Co., New York I-1
Welding and cutting apparatus; torches; regulators; oxygen and acetylene.

Ludlum Steel Co., Watervliet, N. Y. C-42
Tool steels; stainless steels; nitriding steels.

Lufkin Rule Co., Saginaw, Mich. M-37
Precision tools; micrometers; gages; measuring tapes; rules.

Lydon Bros., Jersey City, N. J. G-22
Heat treating furnaces.

M

MACHINE DESIGN, Cleveland E-34
Publications and technical books.

Macklin Co., Jackson, Mich. E-15
Grinding wheels; cut-off machines.

Magnaflux Corp., Pittsburgh F-19
Magnetic inspection method and equipment.

Magnetic Analysis Corp., Long Island City, N. Y.....C-41
Magnetic analysis equipment.

Mahr Mfg. Co., Minneapolis.....M-11
Oil and gas furnaces; burners.

Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J. F-7
Grinding wheels; cut-off machines.

Marburg Bros. Inc., New York F-30
Cutting tools; gages; pneumatic hammers.

Charles A. Martin Co., Chicago G-20
Valves; temperature controls.

Metal & Thermit Corp., New York D-30
Welding electrodes; thermit welding materials.

Metal Forming Corp., Elkhart, Ind. N-8A
Hollow moldings; welded, lock and butted joint tubing.

Metallizing Co. of America, Los Angeles N-1
Metal spraying equipment.

Lee B. Mettler Co., Los Angeles G-28
Gas burners.

Michiana Products Corp., Michigan City, Ind. H-7
Heat and corrosion-resisting alloy castings; oil filters.

Michigan Steel Casting Co., Detroit K-36
Heat and corrosion-resisting castings.

Michigan Tool Co., Detroit I-3
Cutting tools; hobs; tungsten carbide tools.

A. Milne & Co., New York L-41
Tool steels; drill steel; special sections; cutlery sheets.

W. H. Miner Inc., Chicago M-7
Commercial laboratory.

Minneapolis-Honeywell Regulator Co., Minneapolis.....J-15
Automatic control systems; indicating and recording instruments.

Molybdenum Corp. of America, Pittsburgh.....F-25
Molybdenum steel and alloys.

Monarch Engineering & Mfg. Co., Baltimore I-21
Furnaces.

N

National Cylinder Gas Co., Chicago L-15
Welding gases; welding and cutting equipment; welding rods; testing machines.

National Tube Co., Pittsburgh E-16
Tubing.

New Jersey Zinc Co., New York.....C-20
Zinc alloys; die castings.

North American Mfg. Co., Cleveland M-34
Gas and oil combustion equipment.

Norton Co., Worcester, Mass. A-41
Grinding wheels; abrasive products.

O

Oakite Products Inc., New York H-10
Cleaning compounds.

Oil Well Supply Co., Dallas, Tex. E-16
Alloy steels; stainless and heat-resisting steels.

Tinius Olsen Testing Machine Co., Philadelphia.....A-15
Testing machines and testing equipment.

P

Page Steel & Wire Division, American Chain Co. Inc., Bridgeport, Conn. E-32
Welding wire.

Park Chemical Co., Detroit G-32
Case hardening compounds.

Parker-Kalon Corp., New York K-7
Screws and fastening devices; bolts and nuts.

Partlow Corp., New Hartford, N. Y. I-24
Temperature controls; thermometers.

Pennsylvania Salt Mfg. Co., Philadelphia K-10
Industrial salts and chemicals.

(Please turn to Page 139)

COORDINATION

● Hundreds of Keys! The proper touch at the proper time denotes the expert organist. It shows in the high quality of his music. In steel making coordination leads to better steel. The proper grade of clean, uniform ferro-alloy added at the proper time denotes the careful steel maker. It shows in the high quality of his products.

Since 1906 Electromet has made the right ferro-alloys. Electromet Metallurgists will show you how to use them under the right conditions. If you are not entirely familiar with this service, let us send you a copy of the folder "Electromet Products and Service." Write for it.

Electromet
Ferro-Alloys & Metals

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
CARBIDE and CARBON BUILDING
30 EAST 42nd STREET NEW YORK, N.Y.

Continuous

CONTROLLED ATMOSPHERE FURNACES

Designed to Fit Your Specific Requirements

The several installations shown represent a few of the various types of controlled atmosphere furnaces we have built for scale-free heat treating, brazing, and bright annealing miscellaneous ferrous and non-ferrous products in various shapes and forms.

Bright Annealing

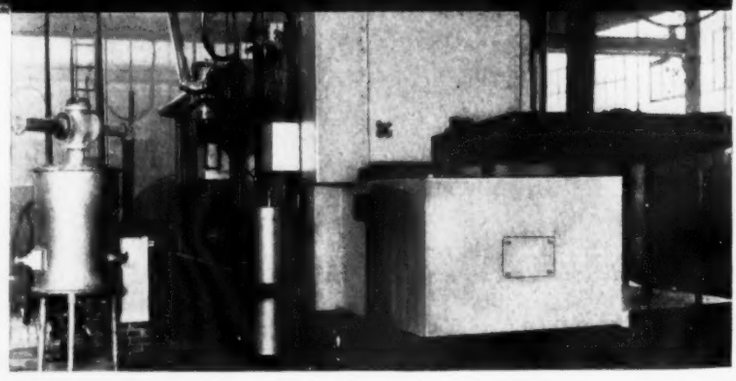
(Left) A recent installation for bright annealing cold drawn seamless steel tubing. Other outstanding installations made for bright annealing ferrous and non-ferrous stampings, wire, sheet, strip and tubing in coils and straight lengths.

Brazing and Soldering

(Right) Two pusher type furnaces brazing miscellaneous automotive and refrigerator parts. The assemblies are automatically conveyed through the furnace and discharged completely brazed — clean and bright. Other types and sizes for various other products.

(Below) One of our standard continuous chain belt conveyor type furnaces designed for use with our inexpensive Elfurno gas atmosphere for clean and bright hardening bolts, screws and other small and medium size products.

Scale-free Heat Treating



The application of controlled atmosphere equipment to the annealing, heat treating and brazing of metals has advanced rapidly since the development of our inexpensive Elfurno gas atmosphere. It should be given consideration in the planning of new furnace equipment or the modernization of present equipment.

Our engineers will be glad to discuss our developments in controlled atmosphere equipment or work with you on any of your furnace or heat treating problems.

THE ELECTRIC FURNACE CO.

SALEM, OHIO.

Fuel Fired Furnaces

Electric Furnaces

Exhibitors in National Metal Exposition

(Concluded from p. 136)

Perfection Tool and Metal Heat Treating Co., Chicago N-4A
Heat treating.

Plibrico Jointless Firebrick Co., Chicago I-8
Refractories.

R

Radon Co. Inc., New York B-19
Radium radiographic equipment.

Republic Steel Corp., Youngstown, O. D-3
Alloy steels; stainless and heat-resisting steels; tubing; bolts and nuts; architectural sections.

Rex Products & Mfg. Co., Detroit K-11
Metal cleaners.

Rich Mfg. Co. Ltd., Los Angeles O-3
Electric arc saw.

Rodman Chemical Co., Verona, Pa. N-19
Carburizing compounds; quenching oil.

John A. Roebling's Sons Co., Trenton, N. J. B-42
Wire and wire rope; cable; wire rope fittings; woven wire fabrics.

Ruud Mfg. Co., Pittsburgh H-23
Water heaters; boilers.

Joseph T. Ryerson & Son Inc., Chicago F-12
Alloy and tool steels; stainless and heat-resisting steels; bearing metal; cold rolled steel; plates; welding rods.

S

Schaar & Co., Chicago N-16
Laboratory and scientific apparatus.

Scully Steel Products Co., Chicago E-16
Structural shapes; bars; plates; tubes.

Selas Co., Philadelphia G-34
Gas premixers; burners; soldering systems.

Sellers Engineering Co., Chicago J-27
Gas burners and boilers.

Sellstrom Mfg. Co., Chicago N-4B
Goggles; eyeshields; welding helmets.

Seymour Mfg. Co., Seymour, Conn. M-19
Nickel silver; phosphor bronze.

Shore Instrument & Mfg. Co., Jamaica, N. Y. M-31
Hardness testing instruments.

Sivyer Steel Casting Co., Milwaukee J-10
Steel castings; heat-resisting castings.

South Bend Lathe Works, South Bend, Ind. O-15
Lathes.

Spencer Turbine Co., Hartford, Conn. H-11
Air compressors; vacuum cleaners.

Star Electric Motor Co., Chicago M-16
Electric motors; dynamos; generators.

STEEL, Cleveland E-34
Publications and technical books.

Steel & Tubes Inc., Cleveland D-3
Tubing.

Steel City Testing Laboratory, Detroit L-8
Testing machines.

Charles G. Stevens Co., Chicago M-8
Wire; strip steel; cold drawn shapes; nonferrous shapes; hot rolled steel; crucible tool steel.

Stewart Die Casting Corp., Chicago M-3
Die castings.

N. A. Strand & Co., Chicago K-24
Flexible shaft machines and attachments.

D. A. Stuart & Co., Chicago A-4
Lubricants and cutting oils; lubricant testing machines.

Surface Combustion Corp., Toledo, O. H-25
Heat treating furnaces; burners; accessories.

Sutton Engineering Co., Pittsburgh L-29
Straightening machinery.

T

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. I-11
Pyrometers; temperature controls.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. E-16
Alloy steels; bars; shapes.

Thermo Control Devices Inc., Chicago L-1
Pyrometers; control equipment.

Thomas Steel Co., Warren, O. E-19
Cold rolled strip steel.

Timken Steel & Tube Co., Canton, O. A-9
Alloys steels; tubing.

Titanium Alloy Mfg. Co., Niagara Falls, N. Y. D-35
Titanium alloys and compounds; iron and steel castings; sheet and tin plate; ceramics; industrial chemicals.

U

Udylite Co., Detroit A-1
Plating equipment.

Una Welding Inc., Cleveland B-31
Arc welding equipment.

Union Carbide Co., New York I-1
Welding and cutting apparatus; oxygen and acetylene; carbon products; ferroalloys.

United States Steel Corp., New York E-16
Carbon and alloy steel; stainless and heat-resisting steels; high tensile steels; wire; strip; bars; tubes; sheets; springs.

Universal Steel Co., Bridgeville, Pa. O-19
Steel plates; sheets; bars.

V

Vanadium Alloys Steel Co., Pittsburgh B-27
Vanadium steels; tool steels.

Vanadium Corp. of America, New York A-16
Vanadium alloys and compounds.

Vapofier Corp., Chicago L-23A
Oil burners.

Victor Saw Works Inc., Middletown, N. Y. L-41A
Hacksaw blades; hacksaw machines.

Vulcan Crucible Steel Co., Aliquippa, Pa. M-23
Forgings; tools; special steels.

W

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. M-20
Wire drawing machinery.

Wells Mfg. Corp., Three Rivers, Mich. N-37
Metal cutting bandsaws.

Wesley Steel Treating Co., Milwaukee K-13
Heat treating.

Western Foundry Co., Chicago M-24A
Aluminum castings; semisteel castings.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. C-16
Electric heat treating furnaces; electric welding equipment.

Wheelock, Lovejoy & Co. Inc., Cambridge, Mass. E-27
Alloy steels; tool steels; machinery steels.

Wickwire Spencer Steel Co., New York C-31
Wire and wire products.

Wilkens-Anderson Co., Chicago M-2
Microscopes; metallographic equipment.

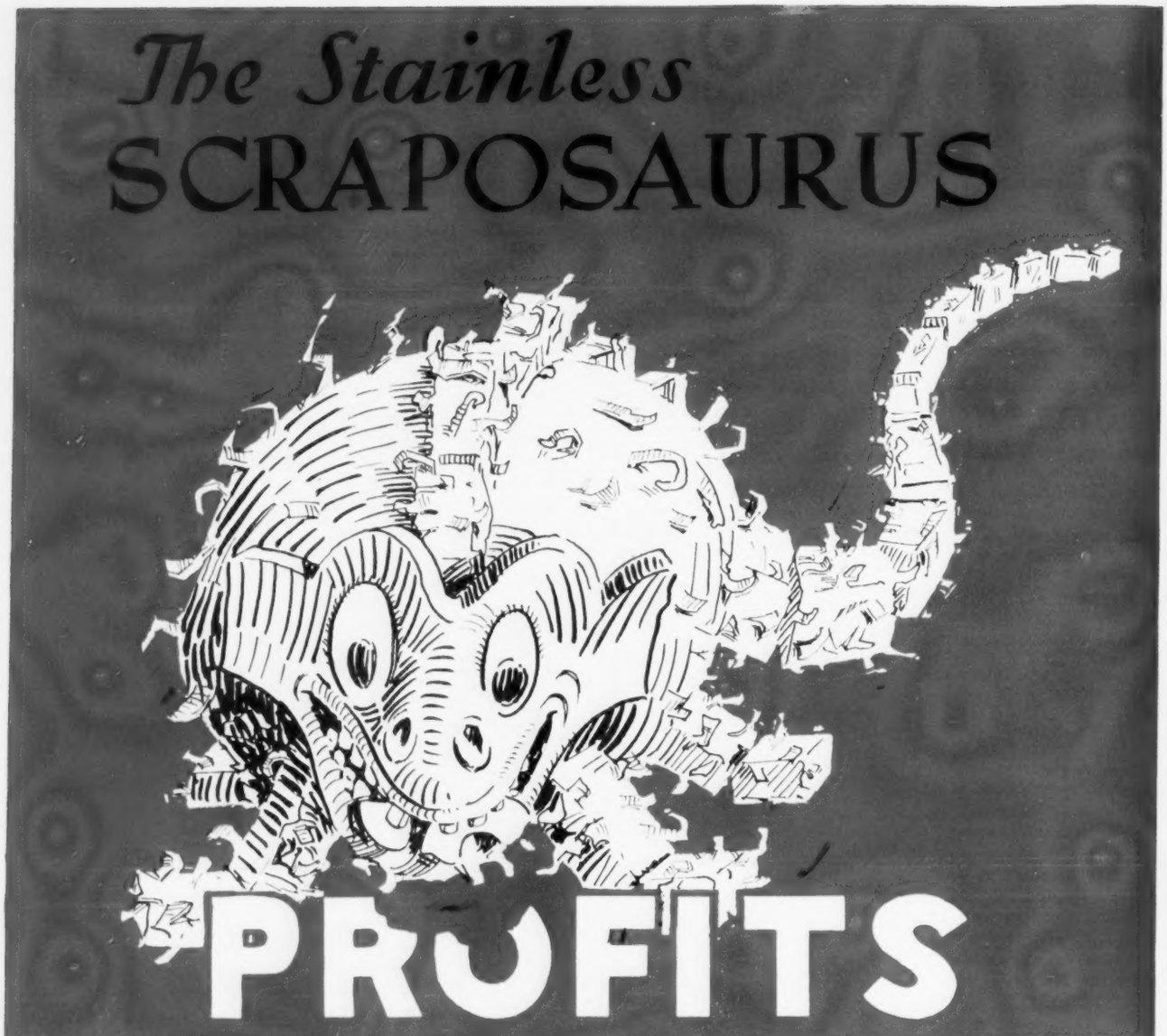
Y

Youngstown Sheet & Tube Co., Youngtown, O. A-24
Alloy steels; structural shapes; sheets; bars.

Z

Ziv Steel & Wire Co., Chicago K-14
Tool steels; wire.

The Stainless SCRAPOSAURUS



PROFITS

Starve this Animal!
~~ Re-melt with

AJAX NORTHRUP

CORELESS INDUCTION FURNACES

Visit us at Booth A-4 National Metal Exposition, Chicago, Sept. 30 to Oct. 4, 1935.

Write today for Bulletin No. 50

AJAX ELECTROTHERMIC CORP. Trenton, N.J.

Announcing . . .

MONARCH COLD FINISHED STEELS

McQuaid — EHN
Grain Size No. 4
Plus or Minus 1
A. S. T. M. Chart

Carburizing
Same treatment as S.A.E. 1020 giving approximately .005 deeper case in same given time.

SPEED CASE

X 1525

OPEN HEARTH

1 SPEED CASE is the fastest machining open hearth steel obtainable. 175-200 surface ft. per min.

2 SPEED CASE Machines Faster than S.A.E. 1112.

3 SPEED CASE Carburizes in less time with harder case and stronger core.

4 SPEED CASE is a Good, Sound, Uniform Steel with the Following Physical Characteristics:

	Hot Rolled	Cold Drawn
Tensile	70000	85000
Yield Point	50000	80000
Elongation 2 in.	37%	26%
Reduction Area	60%	48%

5 If you are now using S.A.E. 1112, X1315, X1314, 1020, 1020-90 or S.A.E. 1120, a trial will convince you that SPEED CASE will save you money and give you a stronger part.

Let Our Metallurgical Department Help Solve Your Steel Problems

MONARCH
COLD FINISHED STEELS
With Machineability Rates are as follows:

SPEED CASE	115%
S.A.E. 1112	100%
S.A.E. X1314	95%
S.A.E. X1315	92%
S.A.E. 1120	80%
S.A.E. X1020	75%
S.A.E. 1020	60%
S.A.E. 1040	58%
S.A.E. 1045	55%

If you desire sample bars for test, advise size and steel will be shipped to you promptly.

X 1525

Quality Extra 35c per 100 lbs.

SPEED CASE Cold Finished Steel is manufactured exclusively by

MONARCH STEEL CORPORATION

INDIANAPOLIS CHICAGO HAMMOND
Tel. Drexel 4224 Interocean 9600—State 9646 Hammond 8000
SPECIALISTS IN COLD FINISHED STEELS AND DRILL ROD

American QUALITY Steel & Wire Company

WIRE PRODUCTS
+
COLD ROLLED STRIP STEEL
+
MANUFACTURING WIRES
+
COLD FINISHED STEEL BARS
+
SPRINGS
+
PREMIER TESTED WELDING WIRE

WIRE PLUS

The products listed above are available in Carbon Steels, S. A. E. Alloy Steels and U S S Stainless and Heat Resisting Steels.

THE ability of the American Steel & Wire Company to produce highest quality Wire and Wire Products is common knowledge. Likewise—industry has found in this source of supply a plus factor of major importance. This factor is the vast amount of practical and technical knowledge that is always available to manufacturers—knowledge that assures the dependable performance of wire when specifically fabricated. In other words—you will find here an economical and satisfactory answer to every wire need.

AMERICAN STEEL & WIRE COMPANY

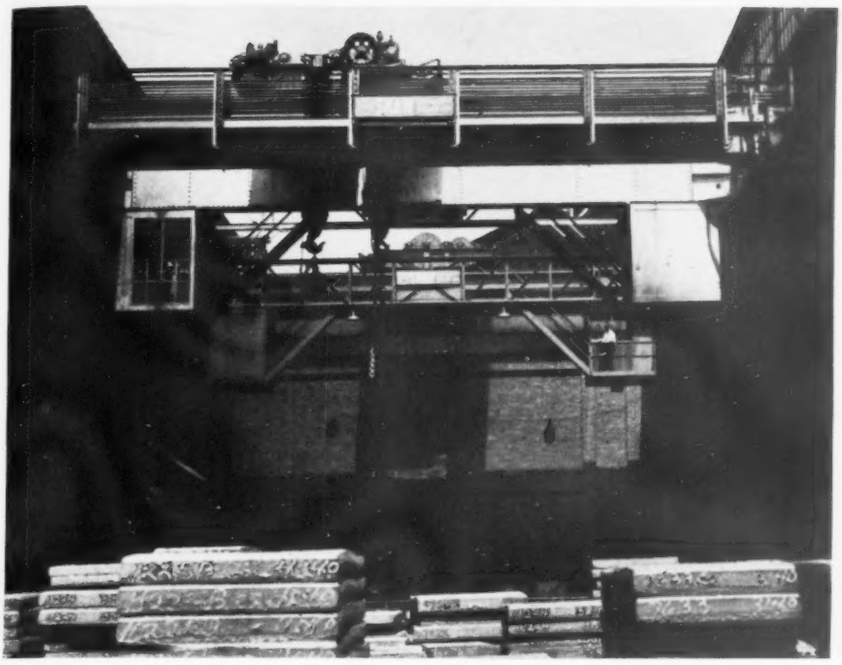
208 S. LA SALLE STREET, CHICAGO · · EMPIRE STATE BUILDING, NEW YORK

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Offices in All Principal Cities

Export Distributors: United States Steel Products Company, New York

United States Steel Corporation Subsidiary



Two 25-ton cranes which serve the slab yard of a 76-inch broad strip mill in the Youngstown district

Slab Yard Cranes Are Built With Hydraulic Brakes

ADVANCED design is featured in the cranes serving a new 76-inch hot strip mill in the Youngstown district. Two 25 and one 15-ton capacity Shaw-Box steel mill cranes are of modern arc-welded design which eliminates excess weight and insures permanent rigidity and alignment of parts. All bridge and trolley details are of welded steel construction.

The trolley frame on which is mounted the entire hoisting and trolley travel machinery, is built of heavy steel channels and plates which are welded together to form a rigid base. A few bolted connections were necessary to facilitate convenience in shipping and erecting and bolts were replaced by rivets after erection thus forming a one-piece frame.

Design of Trolley

A view of the trolley, which has a capacity of 25 tons on the main hoist (equipped with two hooks) and 10 tons on the auxiliary hoist, is shown in the accompanying illustration. The ends of the hoisting machinery shafts are supported on pillow blocks equipped with double Timken bearings. The pillow blocks, constructed on the ball and socket principle to insure positive alignment of the shafts at all times, bearing brackets, and bearing caps, are all cut from heavy steel slabs thus utilizing steel even for the smallest details.

Special closures are provided at all bearings to retain the lubricant and to prevent the entrance of dust or dirt. All gears and pinions are heat treated and are enclosed in oil-tight welded steel gear cases.

The bridge girders are built up of heavy steel cover plates, web plates, chord angles and diaphragms. The web plates are spaced by full length channel diaphragms and intermediate stiffener angles which eliminate vibration as well as develop increased strength and rigidity. Each rivet hole in the girder is drilled by the exclusive Shaw-Box drilling process which assures full bearing strength for each rivet and avoids metal distortion caused by punching. The girder ends are notched and reinforced for connection on the top, sides and bottom, forming an extremely rigid connection to the end truck.

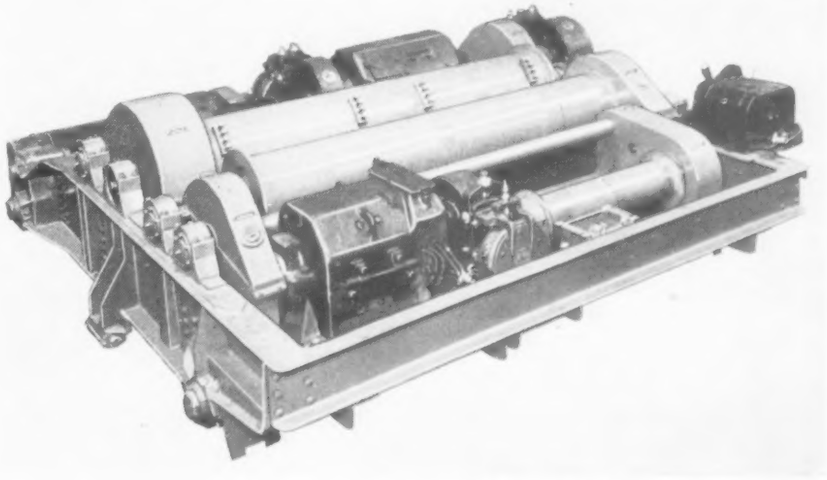
The bridge end trucks, which carry the entire weight of the crane and load, are built up of structural steel members, arc welded to form a rigid box section, one-piece unit. All boring and milling operations are performed after assembly to insure accurate and permanent alignment.

Permanent Alignment Assured

To insure the continued permanent alignment of the main moving parts and to take advantage of the faster acceleration possible when antifriction bearings are installed, the wheel axles and the hoist driving shafts are all Timken-equipped. Thus, all motion and wear is confined to the hardened surfaces of the rolling elements in the bearings. There is no wear on the axles, or shafts, and as the bearings are practically wearproof, the original precise set-up is maintained indefinitely. Less power is required to start the crane and to keep it running, reducing peak loads.

Tapered tread bridge wheels automatically keep the crane bridge square on runway rails which reduces wear and eliminates flange breakage. Steel brackets, cut from heavy steel slabs, have been welded to the end truck to form rigid, well-aligned mountings for the bearings. The wheel bearing bracket and cap is split at the diagonal center line of the bearings, forming the M.C.B.

(*Please turn to Page* 149)

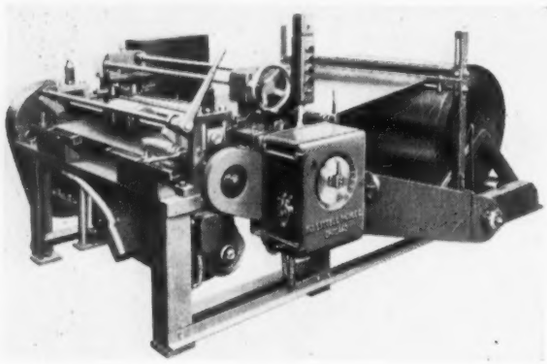


Arc-welded trolley built with a 25-ton main hoist and a 10-ton auxiliary

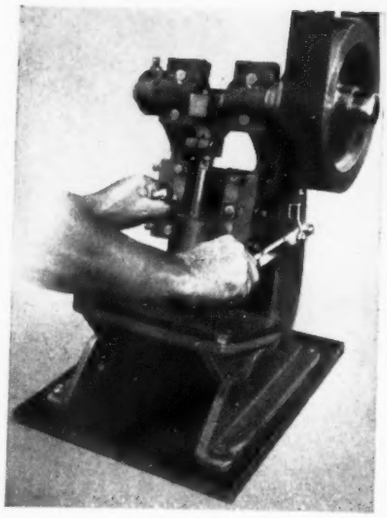
NEW EQUIPMENT

Feeding and Straightening Machine—

F. J. Littell Machine Co., 4127 Ravenswood avenue, Chicago, is offering a motor-driven feeding and straightening machine with power-driven reel for feeding coiled stock for auto bodies and fenders into a blanking press. The only interconnection of the feeding machine with the press is an electrical one. When the press cuts a blank and the press slide starts up, the feeding machine automatically starts and feeds the stock forward the proper length through a five roll stock straightener. The accompanying illustration depicts a unit designed for handling stock 48 inches wide by 0.040 inch thick in coils weighing up to 5000 pounds. A measuring device permits the operator to obtain any length of feed desired merely by turning the handwheel.



Left—Coiled stock 48 inches wide is handled by this Littell feeding and straightening machine



Right—Ross safety device designed for all sizes and makes of hand-operated punch presses

• • •

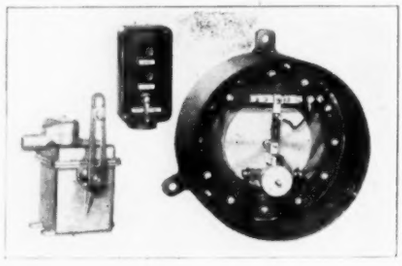
Concentrometer—

Langlois Grinding Co. Inc., 3340 Lambie Place, Detroit, is bringing out a new device known as the P.M.S. concentrometer. This instrument is designed to gage the concentricity of the valve seat with the valve stem guide in motor blocks. Stem of the gage allows for a three point contact and is self-adjusting to either the exhaust or the intake.

• • •

Draft Control—

Shallcross Controls Inc., 3707 North Richards street, Milwaukee, has brought out a type L-125-A draft control. In the accompanying illustration are shown the damper motor, manual station and draft switch which constitute an installation. This control maintains a constant draft within the furnace by continually adjusting the stack damper. It acts to increase the CO_2 and at the same time reduce the flue temperature. As the percentage of CO_2 in a boiler is raised the savings rapidly increase. Travel limits in the damper motor prevent motion of the damper beyond the open or closed positions, on both automatic and hand operation. The draft switch is of the diaphragm type, fully enclosed.



Above—Damper motor, manual station and draft switch which comprise the Shallcross type L-125-A draft control

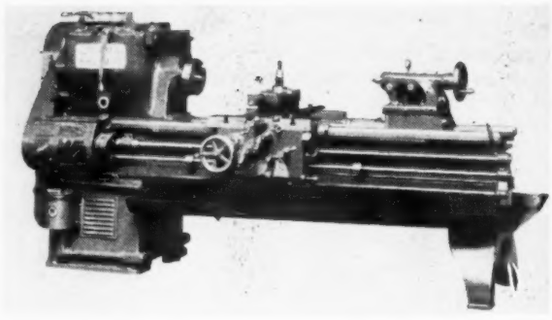
Safety Device for Punch Presses—

David J. Ross Co., Benton Harbor, Mich., is announcing a new safety device for practicaly all sizes and makes of hand-operated punch presses. It consists of a bar, a one-piece housing, operating lever and spring. A touch on the safety lever with the left hand when the press is tripped by the right, releases the punch press lever. In this way both hands are in use and out of the way of danger when the press is operated.

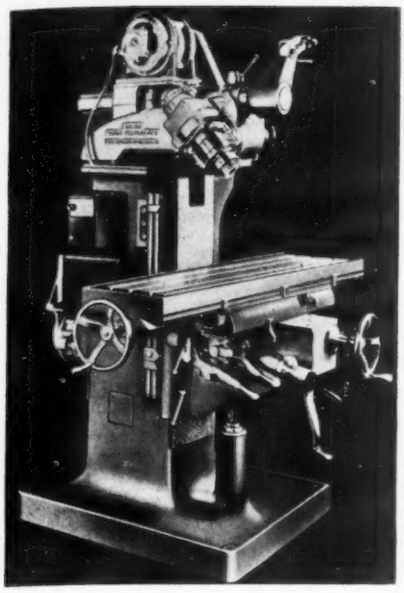
• • •

Geared Head Engine Lathes—

Greaves-Klusman Tool Co., Cincinnati, recently brought out a line of geared head engine lathes. Features of these units, one of which is shown herewith, include reinforced bed with rear extension, spindle cen-



Right—The new Greaves-Klusman geared head engine lathe has reinforced bed with rear extension



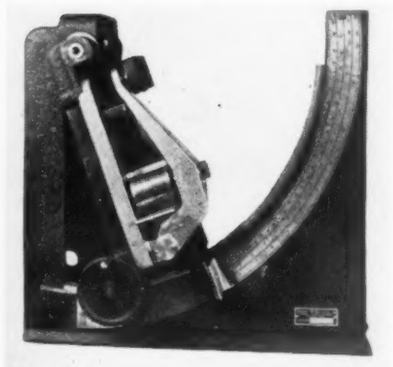
Van Norman No. 32 miller designed for high-speed operation

ter back of centerline of bed, longitudinal feed stops in both directions, tumbler self-locking device for reversing lead screws, dual lever control, etc. Power is transmitted to the spindle through gears directly back of front spindle bearing, reducing vibration and torsional strain to a minimum. Twelve speeds are available.

◆ ◆ ◆

Milling Machine—

Van Norman Machine Tool Co., Springfield, Mass., is announcing its No. 32 universal as the latest addition to its line of milling machines. The unit, shown herewith has a greater range and can handle larger work than any previous machine the company has built. Table travel is 37½ inches, with a table cross feed of 10¾ inches. The knee has a travel of 23½ inches and ram movement in and out on the column is 19 inches. A swiveling cutterhead mounted on a sliding ram permits the milling of vertical, horizontal and angular surfaces on a piece through the entire run of the table, and makes it possible to perform all milling operations on most pieces without changing the set-up.



Dietert high dry strength accessory attached to universal sand strength machine

◆ ◆ ◆

High Dry Sand Strength Accessory—

Harry W. Dietert Co., 676 West Grand boulevard, Detroit, recently placed on the market a high dry sand strength accessory for its type C.P. universal sand strength machine. Capacity of the machine with the new accessory attached, as shown herewith, is 300 pounds per square inch dry compression and 220 pounds dry shear, which is sufficient to break a sand specimen made from sand mixtures that possess exceedingly high dry strength.

◆ ◆ ◆

Goggle—

American Optical Co., Southbridge, Mass., has introduced a new goggle of improved appearance and which embodies features that make it comfortable to wear. For the customary nose-piece, the new goggle, shown herewith, substitutes pearl full-rocking nose pads. Ear pieces are of flexible cable, competely insulated so that no metal touches the skin. These ear pieces are set high on the rims, removing every obstruction to full side vision. The new 6-curve Super Armorplate lenses are employed, the domed surface of the lens being exceptionally effective in deflecting glancing blows.

Full side vision is feature of new American Optical Goggle

◆ ◆ ◆

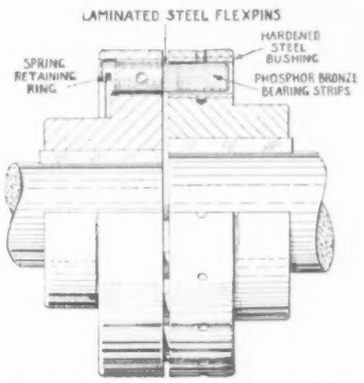
Flexible Coupling—

Smith & Serrell, 11A Halsey street, Newark, N. J., recently announced a new flexible coupling, shown herewith. Twenty-one regular sizes are listed, rated up to 4200 horsepower per 100 revolutions per minute, and for shafts up to 13¼ inches in diameter. Design embodies a bundle of steel laminations, copper coated to resist rust, and held in a slotted keeper by hardened steel cross pins welded in place. The flexpins are retained in place in one flange by a spring retaining ring, or by radial bolts in the larger sizes.

◆ ◆ ◆

Lapping Machine—

Michigan Tool Co., Detroit, has developed a lapping machine for finishing steering gear worms. Features of this unit, shown herewith, include automatic timing, variable for each side of the thread; adjustable center distance, allowing recutting of laps; two lap spindles with an adjustable hydraulic brake on each; and work running on centers, eliminating adapters and costly tooling. The machine is designed to accommodate a complete range of steering gear worms.



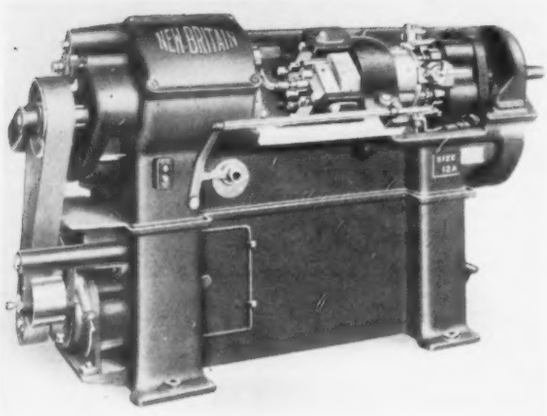
Flexpin coupling recently developed by Smith & Serrell

◆ ◆ ◆

Vacuum Power Switch—

Continental Electric Co., 210 South First street, St. Charles, Ill., is mar-

Steering gear worm lapper introduced by Michigan Tool Co.



KNOWN as No. 12A, this New-Britain 3-spindle tool rotating-type chucking machine represents a continued development of this class of equipment

keting a new vacuum power switch that eliminates the use of tilting or rotating devices in making or breaking contact. The unit incorporates a solenoid in its construction which controls the position of the contacting mechanism in making or breaking the circuit. Contacting mechanism is enclosed in a high vacuum chamber which is hermetically sealed in a strong metal container. It can be used in corrosive or flammable atmospheres without danger. Applications include remote control and high voltage installations.

◆ ◆ ◆

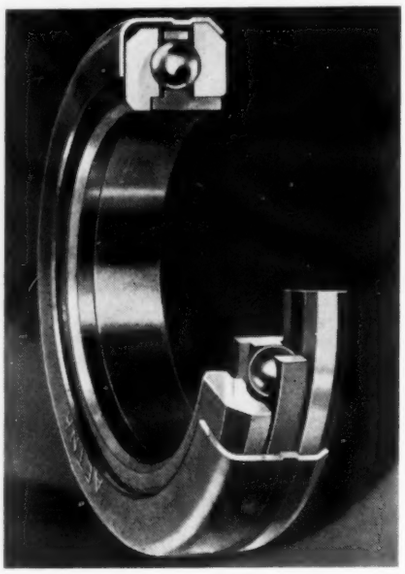
Group-Operated Switches—

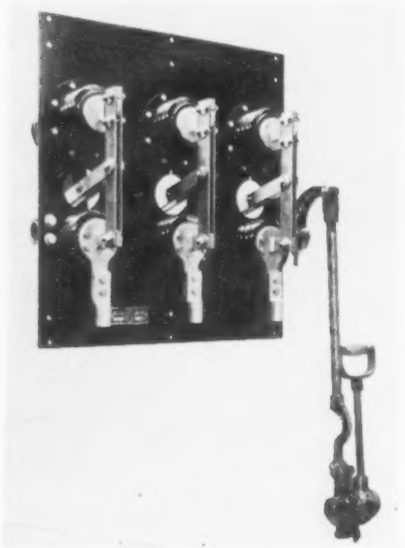
Delta-Star Electric Co., 2400 block, Fulton street, Chicago, has developed a line of group-operated 3-pole indoor disconnecting switches with tongue-type contacts, double blades and an operating mechanism that can be locked in either open or closed position. In the type 3CJH-34 7.5 kilovolt ampere, 400-ampere switch, shown herewith, the top insulator is of the back connected bushing type; the lower insulator is front connected. Various combinations, however, can be furnished. Base is steel and arranged for either flat or pipe mounting.

◆ ◆ ◆

Clutch Release Ball Bearing—

Aetna Ball Bearing Mfg. Co., 7310 Woodward avenue, Detroit, recently developed a new clutch release ball bearing made for modern speeds and heavy loads. Use of these bearings, shown herewith, eliminates the cost of oil and grease fittings as well as the machining operations for their installation, the manufacturer claims. A special bronze ball retainer provides extreme quietness in operation due to bronze on steel contact between the balls and the retainer.





Above—Aetna clutch release bearing
Left—New Delta-Star switch
Right—Yarnall-Waring steam trap

◆ ◆ ◆

Three-Spindle Tool Rotating Type Chucking Machine—

New Britain-Gridley Machine Co., New Britain, Conn., is offering a No. 12A 3-spindle tool-rotating type of chucking machine that represents a continued development of this type of unit which the company has been manufacturing for more than 25 years. The new model, shown herewith, provides the rigidity, spindle speeds and accuracy necessary to utilize properly modern cutting steels and materials, and particularly to take full advantage of the latest developments in cutting steels.

Spindles are provided with independent speeds and feeds so that the correct cutting speed and feed may be secured for each tool.

◆ ◆ ◆

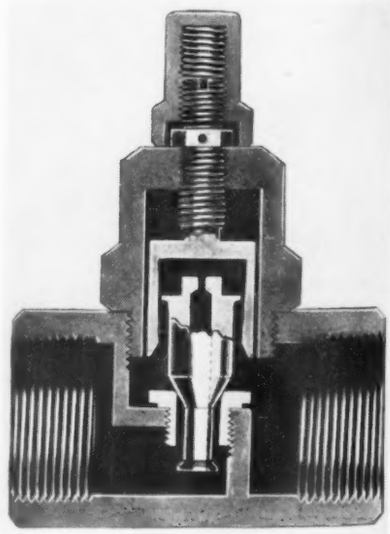
Steam Trap—

Yarnall-Waring Co., Chestnut Hill, Philadelphia, has brought out a new steam trap made in six sizes, ½ to 2 inches. The body of the unit, shown herewith, is made of cold rolled steel, the working parts of hard monel, and the bonnet and cap of brass. Each trap is factory set to operate all pressures from 0 to 400 pounds. It depends for its operation on the difference in flow characteristics of cold water, hot water and live steam, flowing through two orifices with a chamber between. There is only one moving part, the valve disk itself. Its movement is governed by variation in pressure in the space above the valve piston, these changes in pressure occurring with changes in temperature of condensate ranging from cold water to water at steam temperature.

◆ ◆ ◆

Power Saw Machine—

Rasmussen Machine Co., 1014 Eighth street, Racine, Wis., now is building a power saw machine that may be operated as a fully automatic unit when employed for cutting off duplicate pieces from bar stock, or it may be set to complete a cut and stop. Either square or angular cuts can be made. The machine, shown



Penola makes and sells more steel mill grease than any other company in the world!

That one fact is the best indication of Penola's leadership in steel mill lubrication, not only today, but for half a century. Since 1885, every design change in steel mill equipment has found this organization *ready* with the lubricants that satisfied every requirement accurately and adequately.

In fact, Penola started out by serving the steel industry and actually grew up with it. As a result of Penola's alert cooperation, steel mill machinery worth millions has been kept safe and efficient year after year.

Steel men everywhere recognize Penola as the leading authority on steel mill lubrication, and turn their problems over to Penola engineers.

All Penola's skill and experience are at your disposal. You'll find that it pays to consult Penola whenever lubrication difficulties must be met—money saved—and protection assured.

GOLDEN ANNIVERSARY 1885 PENOLA 1935

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PENNSYLVANIA LUBRICATING CO.
PITTSBURGH, PA.
Grease works operated at
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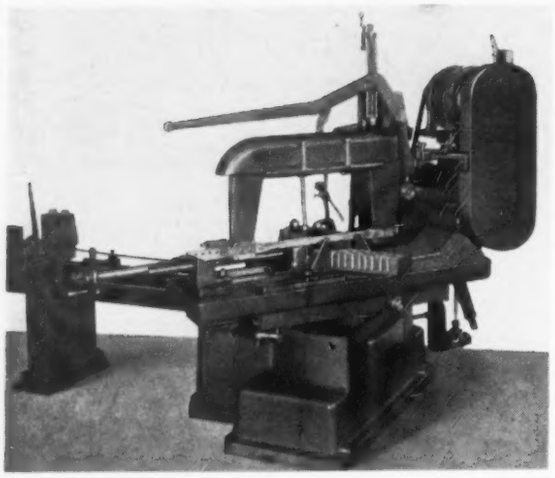


WHEN this Rasmussen power saw unit is used for cutting duplicate work the machine is set up and started, after which its operation is entirely automatic. It also may be set to complete a cut and stop

herewith, also is designed for hand operation, the change being accomplished by turning a knob. In addition to its use as a cutting off machine, this equipment may be employed for deep slotting and similar work. The stock feeder automatically provides for cutting off pieces up to 24 inches in length. Provision, however, is made for cutting longer pieces.

♦ ♦ ♦

Crankshaft Lathe—

Wickes Bros., Saginaw, Mich., announces the development of a new automatic center drive type crankshaft lathe designated model C. This unit, shown herewith, was designed for cheeking, turning and filleting of all main line bearings, for turning and shouldering the stub end of crank, for turning and straddle-facing the flange and turning the oil groove complete on four, six and eight-throw crankshafts having three, four or five main line bearings. Work cycle is entirely automatic. Electric jogging buttons are provided so that the main drive gear or tools may be jogged to any position desired for setting up the machine.

♦ ♦ ♦

Universal Turret Lathe—

Foster Machine Co., Elkhart, Ind., announces a new 1½-inch, universal turret lathe which, as shown in the accompanying illustration, represents a considerable departure from the regular geared head design. It is intended to yield full production from the new cutting alloys and to provide ample reserve for future developments. The new machine is built in 1½, 2 and 2½-inch round bar capacity.

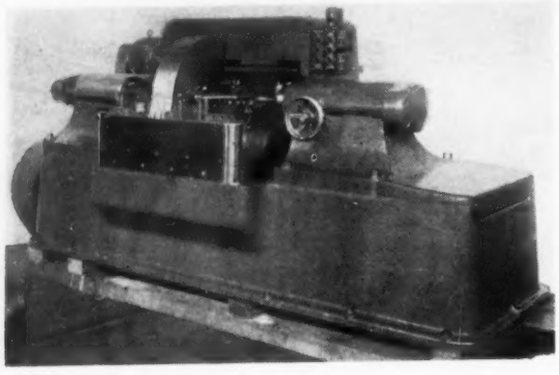
A 4-speed motor drives a 2-speed transmission, both mounted in cabinet base. Drive from transmission to backshaft is by means of V-belts, with eight speeds from transmission to backshaft. Drive from backshaft to spindle speeds each, a high range for bar work and a low range for chucking work. Change from high to low range is by multiple disk clutches and may be made instantaneously while machine is under cut. The 16 spindle speeds all are dial selected. Spindle is provided with brake for quick stopping. Unlimited high spindle speeds are facilitated by the fact that there are only four gears in the head.

Bed is rigid, of the box type, and is provided with adjusting blocks for leveling. Bed has nitrided V-ways whose brinell is more than 1000. Automatic chuck and bar feed are operated hydraulically and automatically, eliminating fatigue on the part of the operator.

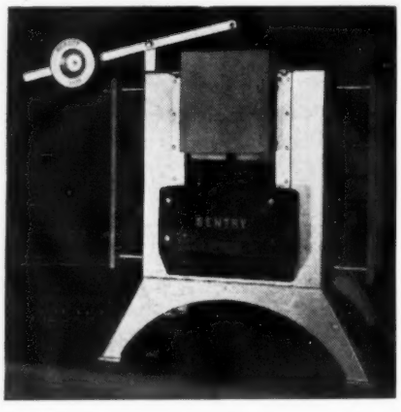
♦ ♦ ♦

Electric High Speed Steel Hardening Furnace—

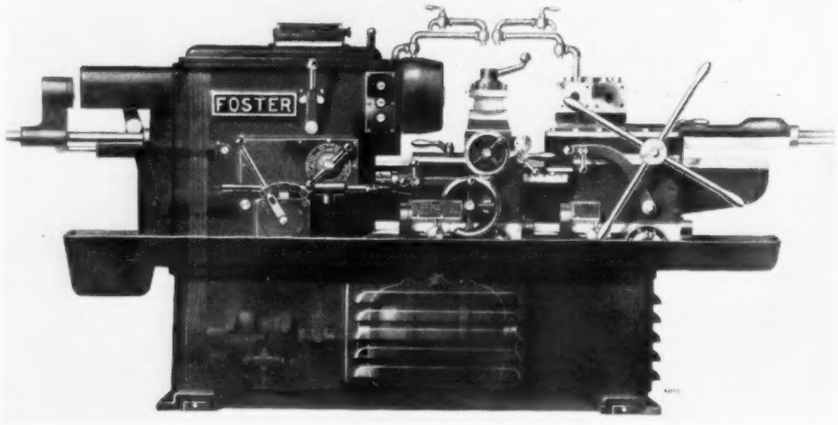
Sentry Co., Foxboro, Mass., recently introduced a model Y electric furnace designed especially for small tools whether hardened on a production or intermittent basis. Operating temperatures are available up to 2500 degrees Fahr. The furnace, shown herewith, is of rugged construction wtih a steel shell suitably insulated for high temperature operation. It is designed for bench mounting with the hearth 15½ inches above the top of the bench. Pedestal mounted furnaces with the hearth 43½ inches above the floor also are supplied. With reasonably new heating elements the unit will heat from cold to 2350 degrees Fahr. in considerably less than an hour.



Left—Automatic center drive type crankshaft lathe built by Wickes Bros.



Right—Electric high speed steel hardening furnace developed by Sentry Co.



Foster 1½-inch universal turret lathe is designed to derive full advantage of modern cutting materials and to provide an ample reserve for future improvements

Forum on Modernization

(*Concluded from Page 68*)

parts with oil cans and grease guns occasionally.

One heavy turret lathe builder has designed aprons of his latest machine so that they are enclosed and the parts in the apron not only run on ball and roller bearings, but also run in oil and all these parts are protected from dirt from the outside by being enclosed. The engineers have had in mind the use of all the power at the cutting tool instead of consuming a great part of it in friction on the way to the cutting tool. This enables the tool to cut more metal at less power cost and while this may seem a small matter, we would like to have some of the engineers figure up the amount of loss in power due to friction on the way from the motor to the cutting tool. We believe they will be surprised at the waste in this respect. Suppose on a modern machine tool the power saved, from friction loss and applied directly to the cutting tool and removing metal, amounts to only 25 cents per hour or $2 for an eight-hour day. It would amount to $500 saved in 250 days. Have the cost accountant figure it for the whole shop!

Machine tool engineers have also been striving for a machine that will produce with closer accuracy and they are accomplishing this and not only are able to produce the part in less time, but accurate within the fraction of a thousandth of an inch and these parts are produced to fit other parts accurately. There is a considerable savings in the fitting of parts and in the savings from scraping and filing and reaming and fitting. This waste is taken care of by the accuracy of the parts produced. When they are accurately produced, they go together easily, and work better and last longer. Every fifteen minutes spent in extra fitting amounts to from 25 to 50 cents or more in cost.

Saving the Operator

Today's machine tool designer always has had in mind the operator of the machine. He has made machines with levers and handles and pushbuttons and oiling devices to assist the operator. The machine is not a "man killer." The operator is not so worn out that he cannot give thought to his work and take a greater interest in it. This saves labor turnover, which is an important factor in waste. This is an indirect expense not considered by most men responsible for costs. Of course, there are shops where these features are kept in mind, but the recent survey of the age of machine tools in various shops leads us to believe that the great majority of shops are not thinking along the line of return from an investment in modern machine tools as compared with old expensively operated tools.

Furthermore, there appears at present to be some prospect of currency inflation. Where could a man invest his money under present conditions with greater safety than in modern machine tools where the depreciation is bound to be normal and where the valuation is bound to remain stable, compared with the fluctuating value of money exchange?

There are some industries with leaders seemingly aware of the good investment features of modern machine tools and equipment, who, by taking advantage of this investment feature, have been able to get the price of their product within reach of the prospective market and thus increase their volume and outlet. These far-sighted leaders are called lucky. Is it luck or reasonable common business sense?

Survey Reveals Increasing Use of Carbide Tools

(*Concluded from Page 71*)

thoroughly established on cast iron, steel, hard chilled cast iron, brass, bronze, aluminum alloys, and other nonferrous materials. Use of cemented carbides for machining steel seems to have increased in line with the recent improvements in tool materials for use on steel. Thirty-five concerns reported successful application on various types of steel, as compared with 26 in the previous survey. Use on the austenitic type of stainless steel (18-8) which work hardens while being cut, seems well established, according to Mr. Prosser.

About 60 per cent of the users grind their tools by machine as compared with off-hand grinding. It is obvious that in many cases machine grinding must be employed, but it is Mr. Prosser's opinion that much time could be saved by the use of off-hand grinders equipped with tables so that the correct angles can be set and maintained accurately.

In reply to the question, "Can your present machines be used satisfactorily with the cemented carbides?" the replies were about evenly divided in the case of machining cast iron, and it seemed to be the consensus of opinion that about 50 per cent of machines existing today are suitable.

The meeting was brought to a fitting conclusion with a discussion on metal cutting research by Hans Ernst, research director, Cincinnati Milling Machine Co., Cincinnati. Chip formation under the microscope as recorded by the motion picture camera was shown on the screen. The motion pictures and photomicrographs which comprised a major portion of the paper represented the results of research work carried on by the author's company in an effort to dispel the mystery which has surrounded the action of cutting tools.

By means of these motion pictures taken through a microscope it is possible to show how the formation of the chip varies with different materials, tool angles, etc., and to see how the so-called "built-up edge" is produced. Pictures of this type clearly indicate what must be done to obtain improved performance.

Micro-motion pictures of milling cutter action also were screened. In these the audience was able to study what takes place when using both the conventional and "climb milling" methods. The changes that occur in the chip as it is removed from the workpiece readily can be seen; also the instantaneous changes in rake and clearance angles and the reasons for the characteristically different type of finish in each method of milling.

Slab Yard Cranes Are Built With Hydraulic Brakes

(*Concluded from Page 143*)

type of mounting for convenient servicing. Special provision has been made for adjusting these Timken bearings in the bridge drive wheels. It will be noted that there is an extra tapped hole in the bearing cartridge beside the locking tongue, making close possible adjustment.

The cover plate, which is used to adjust the bearing, has eight threads per inch on the body and 16 locking slots cast into the face, giving a normal adjustment of increments of 0.008-inch. However, the extra hole makes it possible to lock the cover plate in increments of half a slot or 0.004-inch.

Shaw-Box hydraulic bridge brakes are standard equipment on these new units, eliminating the usual system of links and levers from the cage to the brake mechanism. Hydraulic brakes and the antifriction bearings eliminate catching and jamming when braking.

The crane bridge is provided with two cages, both of welded steel construction. Magnetic control is used throughout. The operator's cage, at the opposite end of the bridge from the control mechanism cage, is fitted with steel sash windows so arranged that the operator has a clear view of the hook and floor at all times. A steel stairway is provided from each cage to the bridge machinery platform, and each end of the bridge has steel stairs from the platform to catwalks above each end truck, providing full accessibility.

Don't Buy "A PIG IN A POKE"

TO buy sheet metal without definite knowledge of what you are getting is a pure gamble . . . you're taking big chances! But why gamble, guess or experiment? The outstanding superiorities of GOHI Pure Iron-Copper Alloy have been proven in scores of installations. Use GOHI and decisively defeat the three racketeers of Wear, Weather and Corrosion.

It is the pure iron, alloyed with the right amount of copper, that gives GOHI its unmatched durability; that makes it the longest-lasting, low-cost ferrous metal you can buy. GOHI has demonstrated its rust-resisting qualities through more than a quarter century of service in drainage culverts, probably the most destructive use to which any sheet metal can be subjected. Choose GOHI for permanence.

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PURE IRON - COPPER ALLOY
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GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company, Newport, Kentucky.

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PRONOUNCED "GO-HIGH"

SHEET METAL

THE NEWPORT ROLLING MILL COMPANY . . . NEWPORT, KENTUCKY

Strength Shown in Miscellaneous Demands

Rate Little Affected by Pause in Automobile and Tin Plate Requirements

MARKET IN TABLOID

DEMAND *. . . Hesitancy in automotive; lighter for tin plate; others steady.*

PRICES *. . . Strong. Scrap continues to advance. Foundry premium coke higher.*

PRODUCTION *. . . Ingots down 2 points to 52 per cent. Sheet output up 10 points to 70 per cent.*

SHIPMENTS *. . . Steel steady; raw materials increasing.*

DESPITE further delay on the part of automobile manufacturers in releasing steel, incidental to model changeovers, and a slackening in tin plate production, steelworks operations last week were off only 2 points.

Rather than indicating any reactionary tendency, however, this only threw into bolder relief the sustaining power of miscellaneous requirements which appeared to be gaining momentum.

Larger automobile tonnage is expected almost daily. To some extent, these orders last week were responsible for lifting sheet output 10 points to 70 per cent. The decline in tin plate to 50 per cent comes as a breathing spell after near-capacity operations for some months, and a measure of recovery is anticipated after stocks are reduced in the fall canning season.

A broader demand is developing for some of the heavier grades of finished steel, especially for industrial development. Factors making for general improvement over the remainder of the year continue strongly on the ascendancy.

Meanwhile, a point of emphasis in the markets last week was the increasing volume of raw material orders and shipments. Scrap prices resumed their advance on a broad front.

Pig iron deliveries are 40 per cent over last month; coke shipments up 40 per cent. Notwithstanding that sanitary ware manufacturers have been among the largest consumers of pig iron this year, those in the Pittsburgh district estimate their car loadings in the coming three months will be 3½ times those of the present quarter.

Due to the sharp rise in general car loadings, some roads contemplate equipment purchases this fall. Only financial difficulties stand in the way of a tremendous buying program by railroads. The spotty character of activity in some of the former mainstays of iron and steel also is manifest in money stringencies for municipal work, leading eastern cast pipe manufacturers to experience their worst year of the depression.

In structural work awards of 18,522 tons are featured by 3000 tons for International Harvester Co. plant expansions, and 4000 tons for a Mississippi river dam. Three oil companies have placed orders for cracking vessels with the Milwaukee fabricator, requiring 2100 tons of plates. Reinforcing bar awards, 14,648 tons, include 500 tons for a pipe line in Ogden canyon, Utah, and 3000 tons for a Los Angeles sanitation project. Washington has just approved a $20,000,000 reclamation project in Central valley, California, which will require a large steel tonnage.

Sales of manufacturing equipment are piling up new records for the post-1929 period. Five million dollars worth were sold at the national machine tool show, Cleveland, just closed, the largest exhibit of its kind ever staged.

Steelmakers suspended the effective date of quantity price differentials on some products until Oct. 1, driving in considerable tonnage for fourth quarter. Pig iron producers now also are considering a price system based on tonnage. Premium brands of Connellsville foundry coke were advanced 25 cents a ton.

Prices of major nonferrous metals again rose sharply. In copper an increase of $10 a ton was ascribed to the European war situation, plus a reduction in world stocks. The gain for copper has been $20 a ton since Aug. 1; for zinc and lead, $7. STEEL's London editor points out heavy inquiries for galvanized sheets from Italian Somaliland.

Steelworks operations last week averaged 52 per cent. Pittsburgh dropped 2 points to 46 per cent; Youngstown 3 to 54; New England 5 to 68. Chicago was up ½-point to 59½; Birmingham 1½ to 50; Buffalo 2 to 37. Wheeling remained at 84; Cleveland 67; eastern Pennsylvania 35½; Detroit 94.

STEEL's iron and steel price composite is up 2 cents to $32.83, due to the rise in scrap, the composite price of which has advanced 17 cents to $12.79. Finished steel index remains $53.70.

COMPOSITE MARKET AVERAGES

	Sept. 21	Sept. 14	Sept. 7	One Month Ago Aug., 1935	Three Months Ago June, 1935	One Year Ago Sept., 1934	Five Years Ago Sept., 1930
Iron and Steel	$32.83	$32.81	$32.79	$32.68	$32.42	$32.15	$32.76
Finished Steel	53.70	53.70	53.70	54.02	54.00	54.00	50.87
Steelworks Scrap	12.79	12.62	12.41	12.05	10.45	9.45	12.81

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Sept. 21, 1935	Aug. 1935	June 1935	Sept. 1934
Steel bars, Pittsburgh	1.85c	1.80	1.80	1.80
Steel bars, Chicago	1.85	1.85	1.85	1.85
Steel bars, Philadelphia	2.11	2.11	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.55	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

Bessemer, del. Pittsburgh	$19.81	$19.81	$19.81	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.31	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.68	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.67	18.88

Scrap

Heavy melting steel, Pittsburgh	$13.75	$13.25	$12.25	$10.75
Heavy melt. steel, No. 2, east. Pa.	11.25	10.50	9.30	8.00
Heavy melting steel, Chicago	12.50	12.35	10.25	8.65
Rails for rolling, Chicago	14.00	13.65	11.25	10.05
Railroad steel specialties, Chicago	13.75	13.55	11.75	9.80

Coke

Connellsville, furnace, ovens	$3.25	$3.25	$3.50	$3.60
Connellsville, foundry, ovens	4.00	4.00	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold strip	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.	1.05
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon Van.	0.95
9250	Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅞-in.	
Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip,	
Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.;	
½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less, Chicago del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½ inch, black and galv.	take 4 pts. over;
2½—6 inch	2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.25-3.40
*Connellsville, fdry.	4.00
*Connell. prem. fdry.	5.00-5.35
New River fdry.	6.00
Wise county fdry.	4.45-5.00
Wise county fur.	4.00-4.50

By-Product Foundry

Newark, N. J., del.	9.20-9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.00
Cleveland, del.	9.25
Buffalo, ovens	7.50-8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol		15.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40,	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10,	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus $1.21	67c, 81c and switching charges		
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50,	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Do., del. Chicago	24.25
Pitts. dist. fur.	18.00	Lake Superior fur.	21.00
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $55.00

First Quality

Pa., Ill., Md., Mo.... $45.00

Alabama, Ga.,Ky., $40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo. 40.00

Ga., Ala. 35.00

Ohio

First quality $40.00

Intermediary 37.00

Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00

Joliet, E. Chicago.... 54.00

Birmingham, Ala.... 52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).... $45.00

Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).. 40.00

Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk).. 22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00

Chemically bonded chrome brick 45.00

Magnesite brick 65.00

Chemically bonded magnesite brick 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $18.75-19.00

Washed gravel, f.o.b. Ill., Ky., net ton, carloads $14.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid 85.00

Do., Balti. base 85.00

Do., del. Pittsb'gh 90.13

Spiegeleisen, 19-20% dom. Palmerton, Pa., spot† 26.00

Do., New Orleans 26.00

Ferrosilicon, 50% freight all., cl. 77.50

Do., less carload 85.00

Do., 75 per cent Spot, $5 a ton higher. 126-130.00

Silicoman., 2½ carb. 90.00

2% carbon, 95.00; 1%, 105.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. 10.00

Ferrotungsten, stand., lb. con. del. 1.35- 1.45

Ferrovanadium, 35 to 40% lb., cont. 2.70-2.90

Ferrotitanium, c. l., prod. plant, frt. allow., net ton 137.50

Spot, 1 ton, frt. allow., lb. 7.00

do., under 1 ton 7.50

Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage 50.00

Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage 65.00

Ferromolybdenum stand. 55-65%, lb. 0.95

Molybdate, lb. cont. 0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
Sept. 14	8.50	8.62½	8.10	49.12½	48.37½	4.35	4.20	4.60	*19.00	13.00	35.00
Sept. 15	9.00	9.12½	8.60	49.62½	48.85	4.35	4.20	4.60	*19.00	13.50	35.00
Sept. 17	9.00	9.12½	8.60	49.50	48.65	4.35	4.20	4.75	*19.00	13.50	35.00
Sept. 18	9.00	9.12½	8.60	49.30	48.50	4.35	4.20	4.75	*19.00	13.50	35.00
Sept. 19	9.00	9.12½	8.60	49.20	48.50	4.50	4.35	4.75	*19.00	13.50	35.00
Sept. 20	9.00	9.12½	8.60	49.00	48.50	4.50	4.35	4.75	*19.00	13.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets

*Yellow brass (high)	14.37½
*Copper, hot rolled	16.00
*Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50

Tubes

*High yellow brass	16.37½
*Seamless copper	16.50

Rods

*High yellow brass,	12.87
*Copper, hot rolled	13.25

Anodes

*Copper untrimmed	13.75

Wire

*Yellow brass (high)	14.87½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

*New York	5.25- 5.50
*Cleveland	5.75- 6.00
*Chicago	5.62½-5.87½
St. Louis	5.25- 5.50

Heavy Copper and Wire

*New York, No. 1	6.75- 7.00
*Chicago, No. 1	6.75- 7.00
*Cleveland	6.50- 6.75
St. Louis, No. 1	6.50- 6.75

Composition Brass Borings

*New York	4.87½- 5.25

Light Copper

*New York	5.50 5.75
*Chicago	5.12½-5.37½
*Cleveland	5.50- 5.75
St. Louis	5.25- 5.50

Light Brass

*Chicago	3.12½-3.37½
*Cleveland	3.00- 3.25
St. Louis	2.75- 3.00

Lead

New York	3.25- 3.37½
*Cleveland	3.25- 3.50
*Chicago	3.25- 3.50
St. Louis	3.40- 3.50

Zinc

*New York	2.50- 2.75
*Cleveland	2.50- 2.75
St. Louis	2.65- 2.75

Aluminum

Borings, Cleveland	8.50- 9.00
*Mixed, cast, Clev.	13.25-13.50
Mixed, cast, St. L.	12.50-13.00
*Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

*Brass ingot, 85-5-5-5	9.00
Stand. No. 12 alum.	16.50-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.50- 9.75
Boston, domestic	7.50- 7.75
Buffalo, No. 1	11.75-12.25
Buffalo, No. 2	10.50-11.00
Chicago, No. 1	12.25-12.75
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Eastern Pa., No. 1	12.00-12.50
Eastern Pa., No. 2	11.00-11.50
Federal, Ill.	9.25- 9.75
Granite City, R. R.	9.50-10.00
Granite City, No. 2	8.00- 9.00
N. Y., deal, No. 2	7.50- 7.75
N. Y., deal, barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.50-14.00
Pittsburgh, No. 2	12.25-12.75
St. Louis	8.00- 8.50
Valleys, No. 1	13.00-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.50-11.00
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	10.00-10.50
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.50-14.00
St. Louis	6.25- 6.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	7.50- 8.00
Cincinnati, del.	7.00- 7.50
Cleveland	9.50-10.00
Pittsburgh	12.00-12.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	7.50- 8.00
Cincinnati	6.50- 7.00
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.00-14.50
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	12.00-12.50
Detroit	11.50-12.00
Pitts., open-hearth, 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	13.00-13.50

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.25-12.75
Pittsburgh	14.75-15.25
St. Louis	11.25-11.75
Buffalo	11.75-12.25

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.00-10.50
Buffalo	10.25-10.75
Chicago	8.00- 8.50
Cincinnati, dealers	6.50- 7.00
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal, fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	13.50-14.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	16.50-17.00
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.00-14.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	13.50-14.00
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.75-17.25
Pittsburgh, sheet bar crops	16.00-16.50

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Chicago	12.25-12.75
Federal, Ill.	9.15- 9.50
Granite City, Ill.	8.00- 8.50

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	11.75-12.25
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.25-12.75
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	9.25- 9.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.25-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.25- 5.75
Chicago	6.50- 7.00
Cincinnati, dealers	5.00- 5.50
Cleveland	7.75- 8.25
Detroit	5.50- 6.00
Eastern Pa.	7.50- 8.00
New York, dealers	3.75- 4.00
Pittsburgh	9.75-10.25
St. Louis	2.25- 2.75
Valleys	8.50- 9.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.00- 7.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.50- 7.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	7.50- 8.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.00- 6.50
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	3.00- 3.50

PIPE AND FLUES

Cincinnati, dealers	5.50- 6.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	4.50- 5.00
Eastern Pa.	9.00- 9.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.50- 9.00
Pittsburgh	12.00-12.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Cleveland	8.00- 8.50
Eastern Pa.	11.00
St. Louis	7.50- 8.00

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point	10.50-11.00
Buffalo	13.50-14.00
Chicago, net	14.75-15.25
Eastern Pa.	17.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point	12.50-12.75
Eastern Pa.	18.00-18.50
New York, dealers	13.25-13.50
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	13.50-14.00
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.50-14.00
Cincinnati, iron	9.50-10.00
Eastern Pa., iron	12.50
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	14.25-14.75
Pittsburgh, steel	16.50-17.00
St. Louis, iron	9.75-10.25
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	11.75-12.25
Buffalo, mach.	12.50-13.00
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-11.00
Cinci., mach. cup.	9.50-10.00
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.50-12.00

HEAVY CAST

Boston, del.	5.75- 6.00
Buffalo, break	10.00-10.50
Cleveland, break	10.00
Detroit, No. 1, mach. net	11.00-11.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.00-11.50
N. Y., break. deal.	6.75- 7.25
Pittsburgh	13.00-13.50

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.25-13.75
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	9.50-10.00
Cleveland, rail	15.50-16.00
Detroit, auto net	11.50-12.00
St. Louis, R. R.	12.50-13.00
Eastern Pa., R. R.	12.00-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.00-11.50
Boston, dealers	8.00- 8.50
Buffalo	11.75-12.25
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	12.00-12.50

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	13.50-14.00
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	16.00-16.50
Pittsburgh (light)	15.00-15.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00-10.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. E. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.00

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.95c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.17c
Cleveland	2.95c
Detroit	3.04c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.26c
Pittsburgh (h)	2.90c
Philadelphia*	2.93c
Portland	3.60c
San Francisco	3.45c
Seattle	3.60c
St. Louis	3.20c
St. Paul	3.00c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.45c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.25c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.25c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.07c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.695c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.30c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.19c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.20c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.75c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c-3.90c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang.(f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c-4.31c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.05c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70-10-5

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Sept. 19

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.44 5 2 6	$13.99	1 15 0
Basic bessemer	15.44 5 2 6*	12.91	1 12 0
Hematite, Phos. .03-.05	16.06 5 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.17 5 10 0	$18.98	2 7 0
Wire rods, No. 5 gage	41.99 8 10 0	36.38	4 10 0
FINISHED STEEL			
Standard rails	$38.29 7 15 0	$36.34	5 10 0
Merchant bars	1.66c 7 10 0	1.14c to 1.19c	2 6 to 3 5 0
Structural shapes	1.63c 7 7 6	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c 8 0 0	1.54c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c 11 5 0	3.19c	8 15 0
Bands and strips	1.88c 8 10 0	1.45c	4 0 0
Plain wire, base	2.04c 9 5 0	1.85c	5 7 6
Galvanized wire, base	2.38c 10 15 0	2.28c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.65c 12 0 0	2.10c	5 15 0
Tin plate, box 108 lbs.	$4.45 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.67 5 7 6(a)	$17.16	260	$12.51	370	$25.31 (b)69.50
Basic bessemer pig iron	17.29 5 10 0*	12.54	190	11.15	330	27.96
Furnace coke	4.08 0 16 6	6.27	95	3.89	115	7.64 19
Billets	27.17 5 10 0	28.38	430	18.25	540	38.83 96.50
Standard rails	1.82c 8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.90c 8 12 0	1.68c	560	90c	600	2.01c 110
Structural shapes	1.93c 8 15 0	1.65c	550	90c	600	1.97c 104.50
Plates, †¼-in. or 5 mm.	2.00c 9 1 3	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.43c 11 0 0‡	1.86c	620‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.87c 13 0 0	3.45c	1,150	2.25c	1,500	6.77c 370
Plain wire	2.04c 9 5 0	3.15c	1,050	1.73c	1,150	3.17c 173
Bands and strips	2.07c 9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 64.70 per cent over paper sterling.

Bars

Bar Prices, Page 152

Pittsburgh—A month ago steel bar producers had anticipated considerably heavier automotive releases by the third week of Septembr, but usual delays by the automobile makers in swinging over to new models at this time have reacted unfavorably for the moment. These buyers have placed considerable tonnage of bars, but have not issued shipping directions as briskly as might be expected; however, the near outlook is encouraging. Meanwhile, miscellaneous sources are taking in a fair volume of merchant bars and the alloy grades are also sharing in this record.

Cleveland — Considerable latitude is shown by some producers of carbon steel bars in quoting on material which can be shipped prior to Oct. 1. Although extras were announced to go in effect Aug. 10, for consumers not covered by contract, makers are giving buyers generally the benefit of the former schedules when it is to the buyers' advantage. This has resulted in considerable tonnage, which mills are hastening to get out before the fourth quarter. Demand from automobile manufacturers for bars has shown more of a spurt than for sheets or strip. Agricultural implement manufacturers also have been ordering heavily, while the outstanding feature of the market is the strong, miscellaneous character of buying.

Chicago—Bar iron producers have yet to take action on the adoption of quantity differentials and extras similar to those instituted recently by steel bar interests. The base price is unchanged at 1.80c, Chicago, 1.75c, Terre Haute, Ind. Billet steel bars continue 1.90c, Chicago, or Gary. Sales and specifications are steady though requirements of automotive partsmakers are tending upward. The movement of forging bars is stimulated by the approaching application of higher prices on new contracts.

Boston — Demand for bars is steady and well spread among the various finishes, alloy and forging material making the best showing. Miscellaneous industrial buying accounts for a good part of moderate-size shipments. Several of the usual leading consumers, including railroads, are buying little. Broadening of the base classification for hot-rolled carbon bars meets with approval of small-lot consumers and warehouse distributors.

New York—Bar sellers here reported improved buying by jobbers over the past week, the latter laying in some stocks in anticipation of the new schedules on quantities which become effective Oct. 1. Little time is left now for the delivery of such tonnage by the end of the month, so it is expected that in this direction, at least, specification will show a decline. Some improvement is noted in specifications from bolt makers, who in this district are now operating at the best rate in several months.

New York—While most sellers are holding to the new price schedule, some fourth quarter contracting has been done in the third quarter list. At least one seller endeavoring to get local independent jobbers to lump steel purchases so as to obtain advantage of larger quantity differentials.

Philadelphia — Improved buying by jobbers over the past week has been a feature of the commercal bar market. Following the revision in the previously announced quantity extras and deductions, many buyers apparently decided that the new set-up was final and consequently placed some business for stock for delivery by the end of this month, before the new schedules become effective. As a matter of fact, the recent changes have done much to lessen antagonism originally voiced by both jobbers and cold finishers.

Seattle — Effective Oct. 1, mills announce an advance of $1 a ton in prices of mild steel bars and small shapes. The new price will be 2.40c Pacific Coast basing points. In anticipation of the increase, these items are moving freely, but in small tonnages.

Plates

Plate Prices, Page 152

Pittsburgh—Several barge orders still are considered promising, but owing to approach of winter it is reasoned that many prospective barge buyers may now defer purchase to arrange for delivery in spring. Miscellaneous plate orders are more numerous, but tankmakers fail to report any sizable projects, their work being confined to individual lots of generally under 50 tons. On bids opened Sept. 16, McClintic-Marshall Corp., Bethlehem, Pa., was the only bidder on 400, 28-inch i. d. land pipe lengths in ½-inch thickness for Fort Peck dam dredges at $59.19 each, or a total bid of $23,676. Considering 800 connecting links, plus freight, the supplier bid $31,769.66 net. Plates remain based on 1.80c, base, Pittsburgh.

Cleveland—Demand appears to be improving steadily for the heavier lines requiring plates. Orders are being placed more consistently and for larger tonnages. Fabricators are receiving inquiries and awards frequently for 100 and 125-ton oil storage tanks. Occasionally municipal projects are placed for elevated water tanks, most of which apparently are going to a Chicago fabricator which manufactures a patented bottom, much in demand by municipalities. Plates prices are steady.

Chicago—Plates continue to move in best volume to structural fabricators and also to miscellaneous users of the lighter gages. Activity in tank work has been bolstered by the placing of oil refining equipment by several interests, involving 2100 tons of plates. Railroads and equipment builders still take only small lots, but the outlook for freight car buying is improving.

Boston—A steady flow of small orders for miscellaneous needs maintains the aggregate plate tonnage surprisingly well. There is little covering beyond immediate needs. Bridges are taking slightly more material. There is an absence of large steel tank work, pipe and railroad demand. The long range outlook for shipyards is bright. Plates are steady at 2.22c, Boston.

New York—Demand continues to lag. While some good oil refinery tonnage in near prospect, general specifications are light with little interest in fourth quarter contracts.

Philadelphia—Tonnage continues spotty, with little new contracting for fourth quarter. However, district operations have been stimulated somewhat by release of tonnage for work at Sun Shipbuilding Co., Chester, Pa., and in a substantially lesser degree by releases from New York Shipbuilding Co., Camden, N. J., for navy work recently resumed after prolonged labor difficulties. Possibly the largest ship inquiry here for wrought iron plates in a long time involves approximately 500 tons for the dredge JEWETT for United States engineer, Louisville, Ky. Opening last week on quarterly requirements of Pennsylvania railroad revealed firm prices.

Birmingham—Demand is heavy for bridge, boat and other construction in this territory. Shipments are being made by rail to distant points because boats cannot handle the long girders and other shapes.

Seattle — Shops report a fair volume of repair work in hand, with demand for light gages of plates up to seasonal levels. No large projects are up for figures. Several pipe line extensions are being delayed indefinitely.

San Francisco—Plate fabricators were disappointed when the Ogden canyon pipe line project in Utah, calling for 4500 tons of plates, was placed on the reinforced concrete pipe basis. This was one of the outstanding inquiries of the year. Interest is now centered in the opening of bids for 1500 tons for 20 and 24-inch

pipe to be made from 3/16-inch plate for the East bay municipal utility district, Oakland, Calif. Awards totaled 1023 tons, bringing the aggregate for the year to 35,280 tons, compared with 50,085 tons for the corresponding period in 1934.

Contracts Placed

1500 tons, 13 oil refining vessels, Asiatic Petroleum Corp., New York, to A. O. Smith Corp., Milwaukee.

750 tons, reservoir, Cajalco dam, metropolitan water district, Los Angeles, to unnamed interest.

600 tons, plates and structurals, four roller gates for the Imperial dam, Yuma, Ariz., to Dravo Contracting Co., Neville Island, Pittsburgh.

500 tons, specification 119, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

350 tons, nine bubble towers, Standard Oil Co. of Indiana, Chicago, to A. O. Smith Corp., Milwaukee.

250 tons, three oil refining vessels, Wilshire Oil Co., Los Angeles, to A. O. Smith Corp., Milwaukee.

175 tons, schedule 4235, 12th naval district, San Francisco, to unnamed interest.

Contracts Pending

4500 tons, 36 to 48-inch pipe, Ogden canyon project, Utah; placed on reinforced concrete basis.

1500 tons, pipe line, East bay municipal utility district, Oakland; bids opened.

500 tons, 2,000,000-gallon standpipe, Dunkirk, N. Y., bids postponed to Oct. 1 from Sept 10, latter being rejected. H. Platt & Co., Erie, Pa., awarded foundation at $8955. Wallace & Tiernan Co., Newark, N. J. awarded telemeter.

500 tons, estimated, wrought iron plates, dredge JEWETT, for the United States engineer, Louisville, Ky.; bids postponed from Oct. 4 to Oct. 18.

100 tons, 200,000-gallon elevated water tank on steel tower, Henrico county, Virginia, Pittsburgh-Des Moines Steel Corp., Pittsburgh, low on hemispherical bottom type, $11,339; Chicago Bridge & Iron Works, Chicago, low on elipsoidal bottom type, $11,400. Bids Sept. 16 by W. F. Day, county manager, Richmond.

Unstated tonnage, 400 28-inch i.d. land pipe lengths, ½-inch thickness, for Fort Peck dam dredges; McClintic-Marshall Corp., Bethlehem, Pa., low on bids opened Sept. 16 at $23,676.

Unstated tonnage, 34 units, 28-inch welded pontoon pipes, 360 lengths, 28-inch welded land pipe and 20 lengths 28-inch steel pipe, 20-foot lengths, bids Sept. 30, United States engineer, Kansas City, Mo., schedule 16.

Unstated tonnage, 1992 feet, 166 lengths, each 12-feet, 15-inch i.d. rivet-weld shore discharge pipe plates to be $\frac{5}{16}$-inch thick; bids Sept. 27, United States engineer, Jacksonville, Fla., schedule 121.

Timken Roller Bearing Co., Canton, O., has booked an order from the American railroad of Puerto Rico for bearings and boxes to equip two passenger cars.

Sheets

Sheet Prices, Page 152

Pittsburgh — Full-finished sheet shipments to the automotive trade for October assemblies are becoming more of a market feature and a stronger factor in the present 70 per cent rate of operations in the sheet industry. Miscellaneous requirements appear to have diminished somewhat, but on the other hand, galvanized output at 70-75 per cent shows a strong rural market. Pittsburgh base prices for black sheets continue 2.40c; galvanized, 3.10c; and heavy hot rolled, 1.85c. The full finished grades are based on 2.50c, Pittsburgh, for No. 10 gage, and 2.95c for No. 20 gage.

Cleveland — Specifications from automobile manufacturers and parts-makers are steady, aiding to sustain mill operations here and in an adjacent lake district at 65 to 75 per cent. Releases are being received for material for the new models, but so far not in the volume expected. Refrigerator manufacturers are beginning production of new models and are placing substantial orders. Miscellaneous demand is strong.

Chicago—While sheet demand generally is steady, the tendency is upward with further betterment in automotive releases in early prospect. Miscellaneous consumers are taking tonnages at a fairly active rate and the outlook for a maintenance of active demand during the next 30 to 60 days is favorable. Buying continues principally for relatively early needs.

Bids close Oct. 14 with the contracting officer, quartermaster corps, Jeffersonville, Ind., on 154 tons blue annealed sheets, also 11,000 sheets tin plate, 16 x 16 inches, and 11,000 pounds high carbon spring wire.

Boston — Sheet demand is steady and well spread as to consumers and finishes. Buying is confined to immediate needs, however. Several industrial consumers are slightly more active, one being the shovel industry. Many thousands of shovels have been bought in the East for PWA projects, part of the volume to be fabricated in this district. Mill prices are steady and unchanged.

New York—With retail prices on galvanized sheets unsettled, jobbers have bought relatively little galvanized tonnage, notwithstanding the fact that effective Oct. 1, mill differentials to jobbers on this material will be eliminated. The sheet market otherwise is regarded by mill representatives as fairly satisfactory. No large orders are being placed, with specifications generally for early shipment, but orders are rather numerous. Mills report delivery schedules as being somewhat further ahead than a month ago.

Philadelphia—Further automotive buying is reported in this district, with increased specifications from radio manufacturers bolstering the general total. Whether general business will be as good for most sellers this month as in August, is still to be developed. Some sellers report miscellaneous tonnage as off from a month ago. Prices are unchanged.

Buffalo—Sheet mills continue to operate at 60 per cent and are booked sufficiently ahead to make certain there will be maintenance of this rate throughout the remainder of the quarter.

Cincinnati—Demand for sheets in this district is on a level with the preceding week, in absence of an upturn in automotive specifications. The diversity of buying, together with unrelaxed pressure for shipments form a feature of the current market.

Birmingham, Ala.—Sheet mills are still producing actively and shipments are steady. Tennessee Coal, Iron & Railroad Co. is marketing new leak-proof galvanized steel roofing sheets.

Transportation

Track Material Prices, Page 153

Rail inquiries are confined to small lots, but recent orders are sufficient to permit Chicago mills to extend present restricted rolling schedules until the second or third week of October.

Inquiry for freight cars and locomotives continues light but indications of an approaching upturn in equipment buying are seen in the rising trend of freight traffic and in scattered reports of shippers' difficulties in obtaining sufficient cars.

Pullman Standard Car & Mfg. Co. has begun fabrication at its Butler, Pa., works of 1500 railroad cars for the Chesapeake & Ohio, work was commenced Sept. 16, and assemblies on the basis of 25 cars a day are expected to get under way by another two weeks. By Oct. 1 about 1500 men will be at work at the Butler plant.

Directors of the Chesapeake & Ohio have authorized and formal inquiry has been issued for 21,710 tons of 131-pound rails, 500 tons of spikes, 460 tons of tie plates, 150 tons of bolts, and a small tonnage of other accessories. The original estimate of the company's rail tonnage was 30,000 tons.

Norfolk & Western closes Sept. 25 on fourth quarter requirements of shapes, plates and bars, approximately 2500 tons.

Atchison, Topeka & Santa Fe has

appropriated $514,000 for reconstruction of refrigerator cars, work to be done in the road's shops.

New York Central has asked approval of a PWA loan of $457,000 to purchase and install 7400 tons of new rails and accessories.

New York Central will open bids for miscellaneous fourth quarter requirements Sept. 26, but most of the other eastern carriers have not taken action.

Having placed repair parts for 200 cars with various car builders, the Virginian will later issue inquiries for parts for 1300 cars. American Locomotive Co. booked one small engine for a western lumber company.

New extras on axles are bringing protests from some railroads as they claim this will increase the cost of forgings close to 30 per cent.

Locomotives Pending

Canadian Pacific 15.
Royal State, Bangkok, Siam, 8 Mikado type.

Rail Orders Pending

Chesapeake & Ohio, Cleveland, 21,710 tons of 131-pound. Inquiry also includes 500 tons of spikes, 460 tons of tie plates, 150 tons of bolts and a tonnage of other accessories.

Pipe

Pipe Prices, Page 153

Pittsburgh — Tube mill operations in this district hold at about 40-45 per cent, but specifications are made up largely of small lots. Orders for oil country goods appear to have picked up again after a slackening through the first half of September, and mechanical tubing is moving at a better rate to the automotive trade. Allegheny Steel Co. is now prepared to make the following round o.d. sizes: ⅝, ¾, 1, 1¼ 1½, and 1.9 inch, in a new thin wall stainless tubing, with or without carbon steel inserts.

Chicago — The cast pipe market generally remains in the doldrums, due largely to the inability of municipalities to perfect financing for proposed work. Federal funds are slow to be forthcoming for many projects involving cast pipe and orders consequently are light. Prices continue steady.

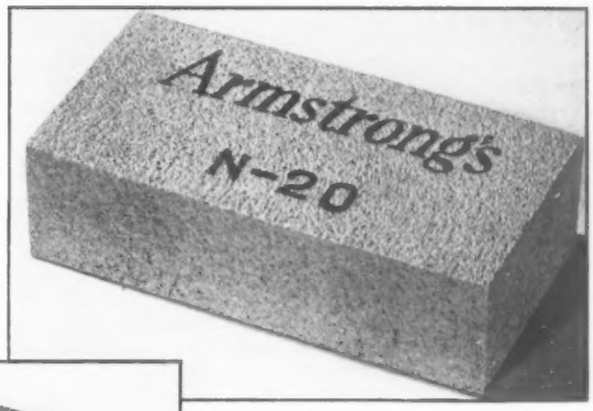
New York—Cast pipe inquiry is sluggish with buying mostly for small fill-in lots. Wrought pipe needs are heavier for work relief projects. Albert Pipe Supply Co., Brooklyn, N. Y., is low on 750 tons of pipe piling, 12 inches in diameter with ⅜-inch wall, and 1500 pieces of fittings for a job here for the procurement division of the treasury department.

NOW ARMSTRONG

rounds out its line with

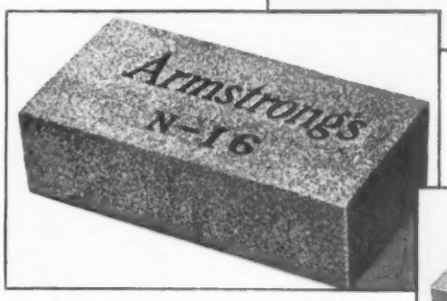
NEW N-20 INSULATING BRICK

These five high temperature products offer brick for a complete range of temperatures and uses.



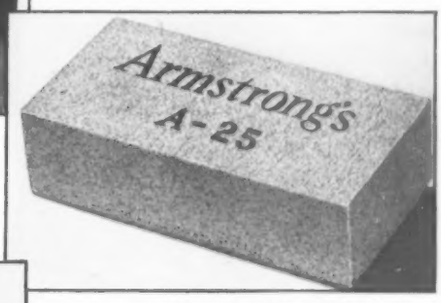
N-20 INSULATING BRICK

For Use Behind the Refractory—Temperature limit 2000° F.; Crushing Strength Cold, in excess of 225 lbs. per sq. in.; weight, 2.1 lbs.



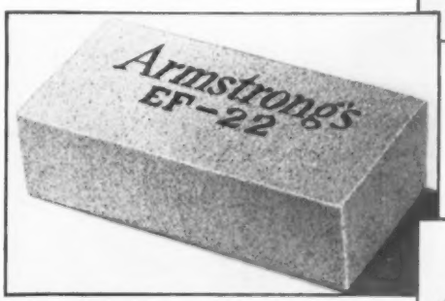
N-16 INSULATING BRICK
(Formerly Nonpareil)

For Use Behind the Refractory—Temperature limit 1600° F.; Crushing Strength Cold, 200 lbs. per sq. in.; Crushing Strength at 1600° F., 218 lbs. per sq. in.; Weight 1.8 lbs.



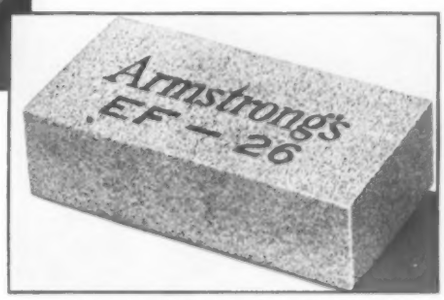
A-25 INSULATING BRICK
(Formerly Armstrong's)

For Use Behind the Refractory—Temperature limit 2500° F.; Crushing Strength Cold, 225 lbs. per sq. in.; Crushing Strength at 2100° F., 91 lbs. per sq. in.; Weight 2.2 lbs.



EF-22 INSULATING FIRE BRICK

For Use Directly Exposed—Temperature limit 2200° F.; Crushing Strength Cold, 340 lbs. per sq. in.; Crushing Strength at 2100° F., 480 lbs. per sq. in.; Weight 2.75 lbs.



EF-26 INSULATING FIRE BRICK

For Use Directly Exposed—Temperature limit 2600° F.; Crushing Strength Cold, 450 lbs. per sq. in.; Crushing Strength at 2500° F., 125 lbs. per sq. in.; Weight 2.75 lbs.

~ ~ ~

All five Armstrong's Brick are available in all standard fire brick shapes and sizes, also special shapes, each brick accurately sized to 4/1000 of an inch.

For additional data and samples, write Armstrong Cork Products Company, Building Materials Division, 985 Concord Street, Lancaster, Penna.

Armstrong's

HIGH TEMPERATURE INSULATION

VISIT US AT THE NATIONAL METAL SHOW—BOOTH L-35

Washington. While the pipe price appeared firm, substantial concession, it is reported, was made on the fittings. Demand for general merchant pipe here is spotty, with the resale price situation still unsettled.

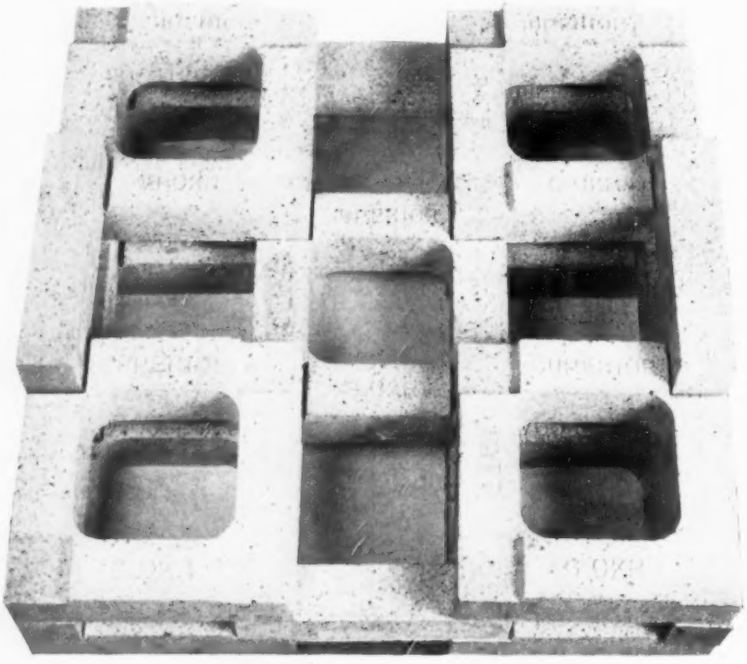
San Francisco — Little activity is noted in the cast pipe markets on the Pacific coast and awards so far this year are less than they were for the same period last year when 28,970 tons were placed, as compared with 24,414 tons this year. Pending business aggregates only 2786 tons. No award has yet been made on 1995 tons for San Francisco. The Union Oil Co., San Francisco, has just placed 1167 tons of 12-inch for a line from Rio Brave and McKittrick districts to their tidewater terminal at Avila, Calif.

Seattle—This city has opened bids for 230 tons of cast 12-inch pipe, but award is pending. Dealers are moving small lots out of stock but at the moment no important tonnages are up for figures. The potential demand is impressive, however.

Boston — Merchant steel pipe is slightly more active for light construction, repairs and public work projects taking small shipments. Cast pipe buying and inquiry is light and, with the approach of severe weather in some sections hampering installations, the aggregate volume placed in New England thus far this year has been below expectations.

THE "SUPERIOR" OPEN HEARTH CHECKER

has already been selected by four of the leading Steel Companies for rebuilding their Open Hearth Checker Chambers because of its simplicity, large heating surface and free area, properly proportioned design and reasonable cost.



SEVEN MAJOR ADVANTAGES:

Increase your Heating Surface from 25% to 60%.
Increase your Free Downward Area per Horizontal Checker Area 40% to 80%.
Decrease Cost of Laying Checker Brick 30% to 50%.
Decrease Resistance and thus Increase the Quantity of Combustion Air.
Eliminate all dead or useless brick in Checker Chamber.
All bricks properly proportioned for efficient heat absorption and transmission.
All brick interlocked as laid.

RESULTS: Increased Tonnage.
Lower Cost per Ton of Steel.

Let us prove these facts by showing the results obtainable in your Open Hearth Checker Chambers.

William M. Bailey Company

Magee Building - - *ENGINEERS* - - Pittsburgh, Pa., U. S. A.

European Agents—Ashmore, Benson, Pease & Co., Ltd., Stockton-on-Tees, England

Cast Pipe Placed

1600 tons, Skiatook, Okla., to United States Pipe & Foundry Co., Burlington, N. J.

700 tons, watermains, Nashville, Tenn., to United States Pipe & Foundry Co., Burlington, N. J.; Bush Building Co., Nashville, general contractor.

320 tons, 12-inch and under, Concord, N. H., to United States Pipe & Foundry Co., Burlington, N. J.

276 tons, 20-inch and under, mostly 8-inch, procurement division, treasury department, New York, for WPA projects, to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

6500 tons, pipe line, Ogden Canyon project, Utah; placed on reinforced concrete basis.

300 tons, 4 to 10-inch, Fresno, Calif.; bids in.

Steel Pipe Pending

50 tons, 12-inch steel piling pipe, with ⅜-inch wall, and 1500 pieces of fittings, procurement division, treasury department; Albert Pipe Supply Co., Berry and North Thirteenth streets, Brooklyn, N. Y., low.

Strip Steel

Strip Prices, Page 153

Pittsburgh—In view of more frequent contracting by automobile manufacturers, strip mill operations in this district advanced 5 points last week to 42 per cent for hot rolled and up a similar amount for cold rolled. Small-lot buying from miscellaneous sources continues, but in addition the larger tonnage users are now issuing heavier specifications for October delivery. Hot-rolled strip remains based on 1.85c, Pittsburgh, and cold rolled, 2.60c, Pittsburgh or Cleveland.

Cleveland—Orders from automobile manufacturers and partsmakers have increased moderately, and are expected to show steady improvement for several weeks. Barrelmakers and manufacturers of building hardware also placed some substantial orders.

Chicago—Strip buying continues well diversified with automotive demand yet to assume the volume anticipated for October. Miscellaneous users are an important factor in maintaining the current volume, though orders usually involve moderate lots for early shipment. Contracting for the entire fourth quar-

ter usually is deferred. Prices are steady.

Boston—Cold strip buying is gradually heavier with a well-spread miscellaneous demand prevailing. Stamping shop requirements have improved with heavier releases by automotive partsmakers. Buying is mostly for immediate delivery and due to the lack of large individual tonnage orders of a size, width or analysis, mills make sustained runs with difficulty and with frequent changes. Price is steady at 2.80c, Worcester, Mass.

New York—Sales here so far this year are in excess of the corresponding period last year. Improvement is noted in diversified lines.

Philadelphia—Far from brisk, strip specifications appear better than a month ago, due in a measure to increased requirements from radio manufacturers. Prices are steady, with no change for fourth quarter, at 1.85c, Pittsburgh, or 2.16c, Philadelphia, for hot-rolled strip and 2.60c, Pittsburgh, or 2.91c, Philadelphia, for cold-rolled strip.

Shapes

Structural Shape Prices, Page 152

New York—While pending inquiry is slightly heavier, additional structural tonnage required in new projects coming out for bids during the past week was light. New York state bridges active take 1500 tons, including projects bid since the first of the month, with more openings this week and Oct. 4. Following the opening on the first section, Sixth avenue subway, New York, Oct. 4, bids are expected about six weeks later on another section, others to follow at regular intervals. A steamship pier, Hudson river, went to a Bethlehem, Pa., fabricator, 1700 tons.

In addition to 3300 tons of shapes and 190 tons of supporting beams for the first section of the Sixth avenue, New York, subway, closing Oct. 4 about 28,000 tons will be required for the entire project.

Shape Awards Compared

	Tons
Week ended Sept. 21	18,522
* Week ended Sept. 14	24,081
Week ended Sept. 7	15,746
This week, 1934	20,028
Weekly average, 1934	16,284
Weekly average, 1935	15,535
Weekly average, August	18,336
Total to date, 1934	651,597
Total to date, 1935	605,850

*Revised

Chicago—Structural awards the past week again were heavy, totaling more than 10,000 tons. While the largest individual order was 4000 tons for a Mississippi river dam, several thousand tons were placed for private construction. The largest of the latter is 3000 tons for plant expansion for International Harvester Co. Inquiries consist almost wholly of public projects, bridge work predominating.

Pittsburgh—Contract award to American Bridge Co., Pittsburgh, low bidder for the 8000-ton Homestead, Pa., high level bridge, was one step nearer last week when federal public works administration officials meeting at Harrisburg approved contracts for the Allegheny county authority's construction program. Independent Bridge Co., Neville Island, Pittsburgh, has closed on the 660-ton lock and dam No. 9 at Rimerton, Pa. Plain structurals are 1.80c, Pittsburgh, but fabricated and erected prices are irregular.

Cleveland—Small fabricating shops are busy with plant addition and alteration work, and some fairly

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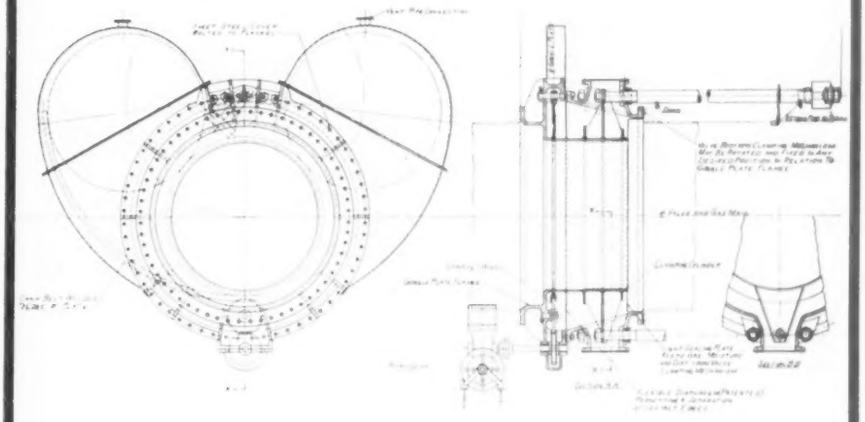

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substantial awards have been made. The latter include 475 tons for a service station at Cleveland's easterly sewage disposal plant, and 220 tons for the Niles Glass Works division of General Electric Co., Niles, O. Fabricators here are figuring on about 2000 tons for the Buffalo federal court house, bids Oct. 10, and on 200 tons for a state highway bridge, at Monroeville, O., bids Sept. 27. Fabricated prices are stronger.

Boston—The bulk of the larger PWA projects will take under 500 tons each, according to most estimates. There will be a few exceptions. Purchasing for WPA, which will get under way first, will be in small lots. Current contracts are light with inquiry but slightly improved.

Philadelphia—Shape mill operations have improved, reflecting releases against recent accumulations of tonnage by district fabricating shops. Most of this tonnage has come from outside the district. The New Jersey board of commerce and navigation has approved construction of a $10,000,000 tunnel under the Delaware river, a little north of Wilmington. The project which will take a larger tonnage of shapes is being sponsored by the newly organized Wilmington-Deep Water Tunnel Co., Camden, N. J. The war department will hold a hearing in Philadelphia Oct. 3, pending its formal approval. This project has been under consideration for a considerable time. Shape prices are unchanged at 1.90c, Bethlehem, or 2.015c, Philadelphia.

Birmingham, Ala.—Structural steel fabricating shops are busy with numerous orders. Ingalls Iron Works Co., here, is manufacturing 18 large beer tanks for a brewery in Miami, Fla., the tanks being welded steel with brewers' pitch lining. Hardie-Tynes Mfg. Co. has a contract for 438 tons of butterfly valves and bulkheads for Boulder Dam, Nevada.

San Francisco—Structural shape lettings in the week aggregated less than 2100 tons. To date this year 80,490 tons have been booked, compared with 100,735 tons in the same period a year ago. Unnamed interests took 877 tons for the gates for the Casper-Alcova dam in Wyoming. Ben C. Gerwick is low on the general contract for 3300 tons of sheet steel piling for the bulkhead at Government Island, Oakland, Calif. It is reported Pacific Coast Steel Corp. will be awarded 5500 to 5750 tons for transmissions towers for the metropolitan water district, Los Angeles.

Seattle—Important projects are under consideration but at the moment no large tonnages are pending in this area. Fabricating plants are

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booking numerous small jobs, averaging 25 to 50 tons.

Shape Contracts Placed

4000 tons, dam No. 8, Genoa, Wis.; 2000 tons of shapes to Treadwell Construction Co., Midland, Pa., 2000 tons of piling to Illinois Steel Co., Chicago.

3000 tons, buildings, International Harvester Co. at East Moline, Ill., Ft. Wayne, Ind., and Springfield, O., to Gage Structural Steel Co., Hansell-Elcock Co. and Vierling Steel Works, Chicago.

1700 tons, pier shed, Eastern Steamship Co., Hudson river, New York, to McClintic-Marshall Corp., Bethlehem, Pa.

1100 tons, bridge, Columbus Junction, Iowa, to Clinton Bridge Works, Clinton, Iowa.

880 tons, factory building, Dearborn, Mich., to Mahon Structural Steel Co., Detroit.

877 tons, Casper-Alcova dam, Wyoming, to unnamed interests.

700 tons, Chevrolet automobile body plant, Tarrytown, N. Y., to Belmont Iron Works, Philadelphia; through White Construction Co., New York.

700 tons, United States customs building, Denver, to McClintic-Marshall Corp., Bethlehem, Pa.; previously reported to unnamed interest.

660 tons, lock and dam No. 9, Rimerton, Pa., to Independent Bridge Co., Neville, Island, Pittsburgh.

625 tons, bridge, Central Railroad of New Jersey at Newark, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

475 tons, service station, easterly sewage disposal plant, Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

470 tons, state highway bridges, to Minneapolis-Moline Power & Implement Co., Minneapolis, allocated as follows: two highway bridges, Minnesota, 105 tons; one bridge, Montana, 185 tons; one bridge, New Mexico, 180 tons.

400 tons, United States mint addition, Denver, to Midwest Steel & Iron Works Co., Denver; previously reported to unnamed interest.

350 tons, bridge, Wellman, Iowa, to Clinton Bridge Works, Clinton, Iowa.

340 tons, state highway bridge, Castle Rock, Wash., to Wallace Bridge & Structural Co., Seattle.

305 tons, buckstays, Ford Motor Co., Dearborn, Mich., to Babcock & Wilcox Co., Beaver Falls, Pa.

250 tons, building, Owens-Illinois Glass Co., Terre Haute, Ind., to Mississippi Valley Structural Steel Co., Decatur, Ill.

250 tons, distillery, Owensboro, Ky., to International Steel Co., Evansville, Ind.

250 tons, transmission towers and switch structure, bureau of reclamation, Denver, to American Bridge Co.

220 tons, building, Niles Glass Works division of General Electric Co., Niles, O., to Ingalls Iron Works Co., Verona, Pa.; previously reported as Erie, Pa.

215 tons, transmission towers, Zanesville, O., to American Bridge Co.

200 tons, Ft. Dearborn postoffice, Chicago, to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, factory building, Charles Lenning Co., Philadelphia, to Frank M. Weaver Co., Lansdale, Pa.

200 tons, state highway bridge, Flat Rock, Mich., to Mahon Structural Steel Co., Detroit.

200 tons, state highway bridge, Peoria, Colo., to American Bridge Co.

200 tons, radio broadcasting station, Detroit, for *Detroit News*, to Whitehead & Kales Co., Detroit.

180 tons, mill house, Yuengling brewery, Pottstown, Pa., to the McClintic-Marshall Corp., Bethlehem, Pa.

180 tons, school gymnasium, Pekin, Ill., to Hansell-Elcock Co., Chicago.

140 tons, state highway bridge, Washtenaw county, Michigan, to Jones & Laughlin Steel Corp., Pittsburgh.

125 tons, various contracts, to Isaacson Iron Works, Seattle.

120 tons, Riverside junior-senior high school, Fort Worth, Tex., to Fort Worth Structural Steel Co., Fort Worth.

115 tons, head frame, Pacific Coast Borax Co., Los Angeles, to unnamed interest.

115 tons, I-beam span, Clark county, Iowa, to Pittsburgh-DesMoines Steel Corp., Des Moines.

100 tons, approximately, housing development, procurement division, treasury department, Washington, at Heightstown, N. J., to Frank M. Weaver & Co. Inc., Lansdale, Pa.

Shape Contracts Pending

3300 tons, sheet piling, bulkhead, Government Island, Oakland, Calif.; Ben C. Gerwick, San Francisco, low on general contract.

2000 tons, relocation of Baltimore & Ohio railroad tracks, Tygarts Valley dam, W. Va.; Guthrie, Marsh, Walker Co., Chicago, awarded general contract at $2,935,217.

1200 tons, dam No. 25, Cap au Gris, Mo.; United Construction Co., Winona, Minn., low for general contract. Mississippi Valley Structural Steel Co.,

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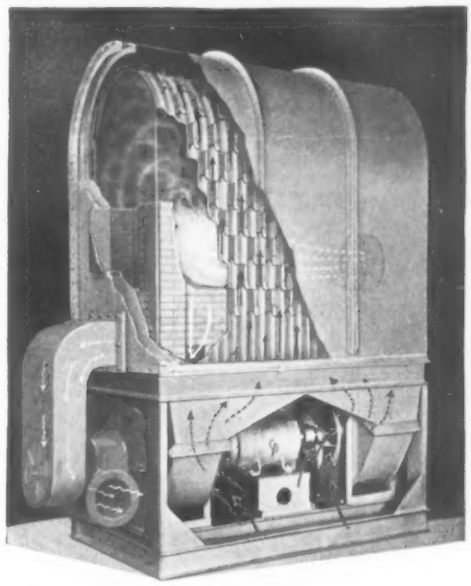

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Decatur, Ill., low for fabricated steel.
1000 tons, Randall's Junction, Triboro bridge, New York, contract No. 47; bids Oct. 10; also 250 tons of wrought cast steel and railing in drainage system.
553 tons, rolled steel armor, fabricating, shop painting and delivering, Pickwick Landing dock, Tennessee valley authority, Washington; bids Oct. 8, also 169 tons steel castings. Bids close Oct. 9 on 129 tons of iron castings for same project.
525 tons, bridge, Butler, Ky.
500 tons, state bridges, Wisconsin.
400 tons, postoffice, Ft. Smith, Ark.
325 tons, state bridges, Arkansas.
350 tons, bridge and underpass, South Huntington avenue, near the Riverway and Brookline village, Boston, Coleman Bros., Boston, low $344,891, bids Sept. 17, state department of public works, Boston, George A. Fuller Co., Boston, second, $380,960.53.
300 tons, postoffice, Tallahassee, Fla.
300 tons, parcel post building, Worcester, Mass.; bids Sept. 26, treasury department, Washington.
265 tons, new or used sheet steel piling, procurement division, treasury department, WPA projects, New York, bids in.
250 tons, state bridges, Wyoming.
250 tons, state bridges, Oklahoma.
219 tons, steel truss bridge, Liberty township, Centre and Clinton counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 1; included 25 tons of plain steel bars.
200 tons, seed house, Memphis, Tenn.
200 tons, state highway bridge, Monroeville, O.; bids Sept. 27 to highway commission, Columbus, O.
175 tons sewage disposal plant, Washington.
100 tons, building, Monsanto Chemical Co., Monsanto, Ill.
100 tons, tobacco warehouse, Burlington, N. C.

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Reinforcing

Reinforcing Bar Prices, Page 153

New York—Reinforcing steel buying, including highway mesh, is active with new inquiry well sustained. While mesh prices are steady, some indirect concesions are being secured by buyers of billet steel bars. Approximately 5000 tons of reinforcing material is active in New York and New Jersey, a good part of it being mesh. Awards include close to 700 tons for WPA projects. Requirements for sewer construction are also heavier.

The board of reclamation, Washington, has approved $20,000,000 for Central valley project in California of which the first unit will be a dam at Friant, to cost $14,000,000.

Pittsburgh — Metropolitan water district, Los Angeles, which recently bought 83,790 tons of reinforcing steel bars, is permitted under its contract to purchase 35 per cent of this total additionally in the near future if required. Bids were taken by the metropolitan water district Sept. 13 on bending and welding of the 83,790 tons already contracted for, and mills in the Pittsburgh district will shortly begin rolling against their shares in this order.

Pennsylvania state highway lettings are beginning to appear with two set for Sept. 27 and Oct. 4 closing. The market is 2.05c, base, Pittsburgh, for carload quantities, cut lengths of new billet quality reinforcing bars, but bids on attractive tonnages are not always consistent.

Cleveland—The market is quiet, only small lots being purchased during the week. Prices are steady.

Chicago—Concrete bar orders for private construction are more numerous, about 500 tons being involved in orders for four local build-

Concrete Awards Compared

	Tons
Week ended Sept. 21	14,648
Week ended Sept. 14	7,065
Week ended Sept. 7	85,781
This week, 1934	4,281
Weekly average, 1934	4,084
Weekly average, 1935	6,691
Weekly average, August	3,829
Total to date, 1934	184,962
Total to date, 1934	260,958

ings. More than 1000 tons remain to be placed for Mississippi river locks and dams, while pending bridges and grade crossing eliminations will take substantial tonnages when such work is released. Highway work in Illinois is slow to get under way.

Boston—Reinforcing steel, including 300 tons for a Boston school, is more active. As now planned, the public works programs under the various administrations, will take reinforcing material in comparatively better volume than heavier building steel.

Philadelphia—Approximately 5000 tons of bars and mesh will be required for the 122 miles of roadwork recently approved by the WPA administration for Pennsylvania. The program comprises 51 projects and it is expected that specifications will start early next month.

Birmingham, Ala.—Demand for reinforcing concrete bars is picking up, with prospects for considerable tonnage late in the fall and early next year.

San Francisco—Well over 11,000 tons of reinforcing bars were placed during the week. Featuring awards were 5000 tons for the Ogden canyon pipe line in Utah, and 3000 tons for the White Point outfall sewer, Los Angeles, both booked by the American Concrete Pipe Co. The metropolitan water district, Los Angeles, awarded 1552 tons of billet steel to Blue Diamond Corp., Los Angeles. Truscon Steel Co. booked 500 tons for the 10-story Lurie building in San Francisco.

Seattle — Several hundred tons are pending for bridge and irrigation projects in Oregon, Idaho and Montana. Awards are ahead of last year to date. Reinforcing bar prices are firm at 2.45c in Seattle and Portland territory.

Reinforcing Steel Awards

5000 tons, 36 to 48-inch pipe, Ogden canyon project, Utah; general contract to American Concrete Pipe Co.

3000 tons, White Point outfall sewer, Los Angeles, to American Concrete Pipe Co.

1818 tons, metropolitan water district, Los Angeles, allocated as follows: 1552 tons billet steel to Blue Diamond Corp., Los Angeles, and 175 tons of billet and 91 tons of rail steel to Los Angeles Iron & Steel Co., Los Angeles.

500 tons, Lurie building, San Francisco, to Truscon Steel Co., San Francisco.

500 tons, procurement division, treasury department, WPA projects, New York, to W. Ames & Co., Jersey City. Bids on 200 tons Sept. 16 were identical quotations.

500 tons, dam No. 8, Genoa, Wis., to unstated interest.

300 tons, Washington Irving school, West Roxbury district, Boston, to Truscon Steel Co., Youngstown, O.; John Bowen Co. Inc., Boston, general contractor.

300 tons, Day street bridge, Montgomery county, Alabama, to Dudley Bar Co., Birmingham; through Noonan Construction Co., Pensacola, Fla.

261 tons, state highway work in six counties, Colorado, to unnamed interests.

250 tons, highway, Laurelton Parkway, Nassau and Queens counties, New York, to Kalman Steel Corp., Bethlehem, Pa.; through Johnson, Drake & Pipe Inc.

250 tons, mesh, highway, Niagara county, New York, to American Steel & Wire Co., New York; through Utica Construction Co. Inc.

235 tons, bars and mesh, resettlement project, Hightstown, N. J., to Igoe Bros., Newark, N. J.

232 tons, housing development for the procurement division of the treasury department, Heightstown, N. J., placed through the Washington offices with Taylor-Davis Inc., Philadelphia; approximately 100 tons of structurals placed with Frank M. Weaver & Co. Inc., Lansdale, Pa.

178 tons, Riverside junior-senior high school, Fort Worth, Tex., to Anderson Iron Works, Fort Worth; H. B. Friedman, Sinclair building, Fort Worth, general contractor.

165 tons, Walter Powers Co. building, Chicago, to Calumet Steel Co., Chicago.

164 tons, specification 636, Uncompahgre project, Colorado, to unnamed interest.

130 tons, bridge, Henry Hudson parkway, at Fieldston road, Bronx, N. Y.,

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to Concrete Steel Co., New York; through A. D'Angelo & Sons Inc.

125 tons, sewer, Elizabeth, N. J., to Igoe Bros., Newark, N. J.; through Linde-Griffith Co.

125 tons, Administration building, sewage commission, Blue Plains, D. C., to Taylor-Davis Inc., Philadelphia.

115 tons, building, Abbott Laboratories, North Chicago, Ill., to Concrete Engineering Co., Chicago.

100 tons, building, Griffith Laboratories, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, building, Baumbach Mfg. Co., Chicago, to Calumet Steel Co., Chicago.

100 tons, Field house, Swarthmore college, Swarthmore, Pa., through Hughes-Foulkrod Co., Philadelphia, to the Kalman Steel Corp., Bethlehem, Pa.

100 tons, miscellaneous items, Grays Harbor, Oreg., jetty project, to unnamed interests; Columbia Construction Co., Bonneville, Oreg., general contractor.

100 tons, highway work in three counties, Wyoming, for state, to unnamed interests.

Reinforcing Steel Pending

5750 tons, Randall's Junction, Triboro bridge, New York, contract No. 47; bids Oct. 10.

5000 tons, approximately, 122 miles of WPA roadwork in Pennsylvania, first inquiries expected early in October; the 51 projects involved were recently approved by the works progress administration in Washington.

2800 tons, intercepting sewer, Manhattan and Bronx, N. Y., in connection with Ward's Island disposal plant; bids Sept. 24, department of sanitation, New York.

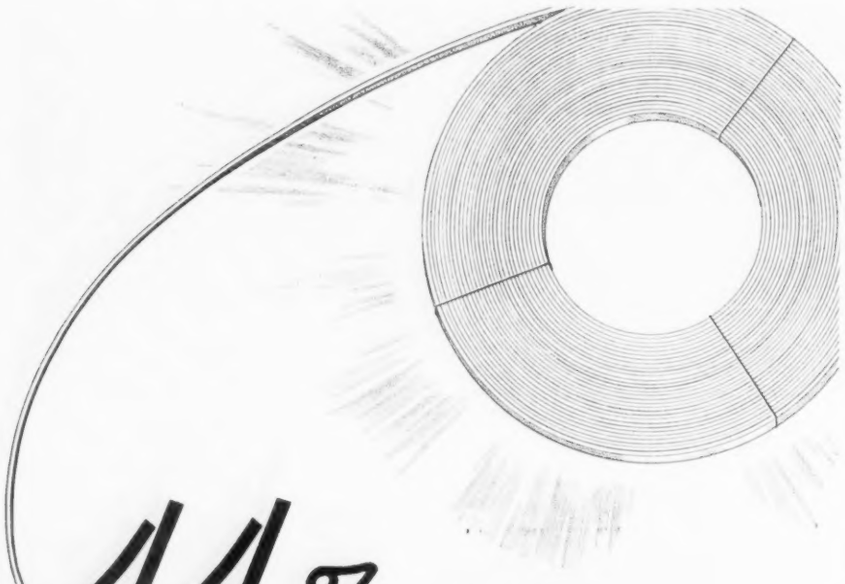
400 tons, state bridge and underpass, South Huntington avenue, near the Riverway and Brookline village, Fenway, Boston, Coleman Bros., Boston, low, $344,891; George A. Fuller Co., Boston, second, $380,960.53; bids Sept. 17, department of public works.

375 tons, Mississippi river lock near Peoria, Ill.; bids to United States engineers, Chicago.

250 tons, Rahway Valley sewage plant, Woodbridge-Rahway, N. J.; bids Sept. 30.

235 tons, substructure, Torrence avenue bridge, Chicago; Mackie-Thompson-Tamm Inc., Chicago, low for general contract.

150 tons, postoffice, Chester, Pa.; bids to be opened Sept. 23.



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PAGE ALLEGHENY ALLOY STAINLESS STEEL WIRE

Wire

Wire Prices, Page 153

Pittsburgh—American Steel & Wire Co. has completed fabrication at its Donora, Pa., works of approximately 1,700,000 square feet of galvanized welded wire fabric for the New Orleans army engineers' district, to be used in flood prevention work. Full application of the quantity differential system of pricing on merchant wire items will be universal by Oct. 1, and producers, in printing revised extra cards, are advising the trade to that effect. There has been no marked amount of stocking of nails, staples, fence wire and other merchant wire items as against this change. In manufacturers wire, activities of automobile makers are making improved demands for plain manufacturing wire, rods and spring wire. Prices are steady.

Cleveland—A strong market continues to prevail for manufacturers' wire, and jobbers' requirements. Demand for agricultural material shows a seasonal decline.

Chicago—Activity in manufacturers' wire continues relatively better than in wire products. Purchases of the latter by jobbers are slow, although heavier consumption in farm districts is anticipated during late October and November, when farmers will have more opportunity for improvements to properties. October also is expected to witness heavier demand from the automotive industry which already is commencing to take larger lots for new models. The wire rod market is unchanged at $39, with an announcement lacking on any change in this figure for next quarter.

Boston—Incoming wire volume is brisk, with manufacturers' wire and specialties leading in demand.

ing far in advance. Makers of covered cable have in several instances increased operations. Cushion spring wire is in good demand, prolonged labor troubles in some small shops outside this district having resulted in scattering considerable of this business among district mills.

Philadelphia—Demand for wire products here is not as brisk as a month ago, but is still holding up in good volume. Prices are unchanged.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 153

Demand for nuts and bolts from automobile manufacturers is holding up, and leads in the market, with jobbers' orders second in importance. At Chicago specifications lately have been moderately heavier, with more liberal releases from railroads. Steady demand from the farm implement industry continues a feature there.

The new 75 per cent discount on bolts and nuts so far has met with little resistance from consumers, despite somewhat lower prices that were in effect previously. A few fourth quarter contracts have been entered, though some buyers are awaiting a determination of the stability of the new market before making forward commitments.

On minor transactions at Pittsburgh the advanced quotation of 75 off list for carriage and machine bolts has been applied, but larger buyers have until the fourth quarter to obtain 70-10-5 off. Large rivets are quoted 2.90c, base, Pittsburgh, and small rivets, 70-5 off; both of these markets being unchanged.

J. K. Larkin & Co., New York appears low bidder on most of 100 tons of galvanized bolts for procurement division, Staten Island, N. Y. J. C. MacElroy & Co. was reported low on a carload of heavy plate washers. The price on 1-inch bolts was reported as approximately 3.35c, possibly the lowest price quoted on galvanized bolts in recent years.

Tin Plate

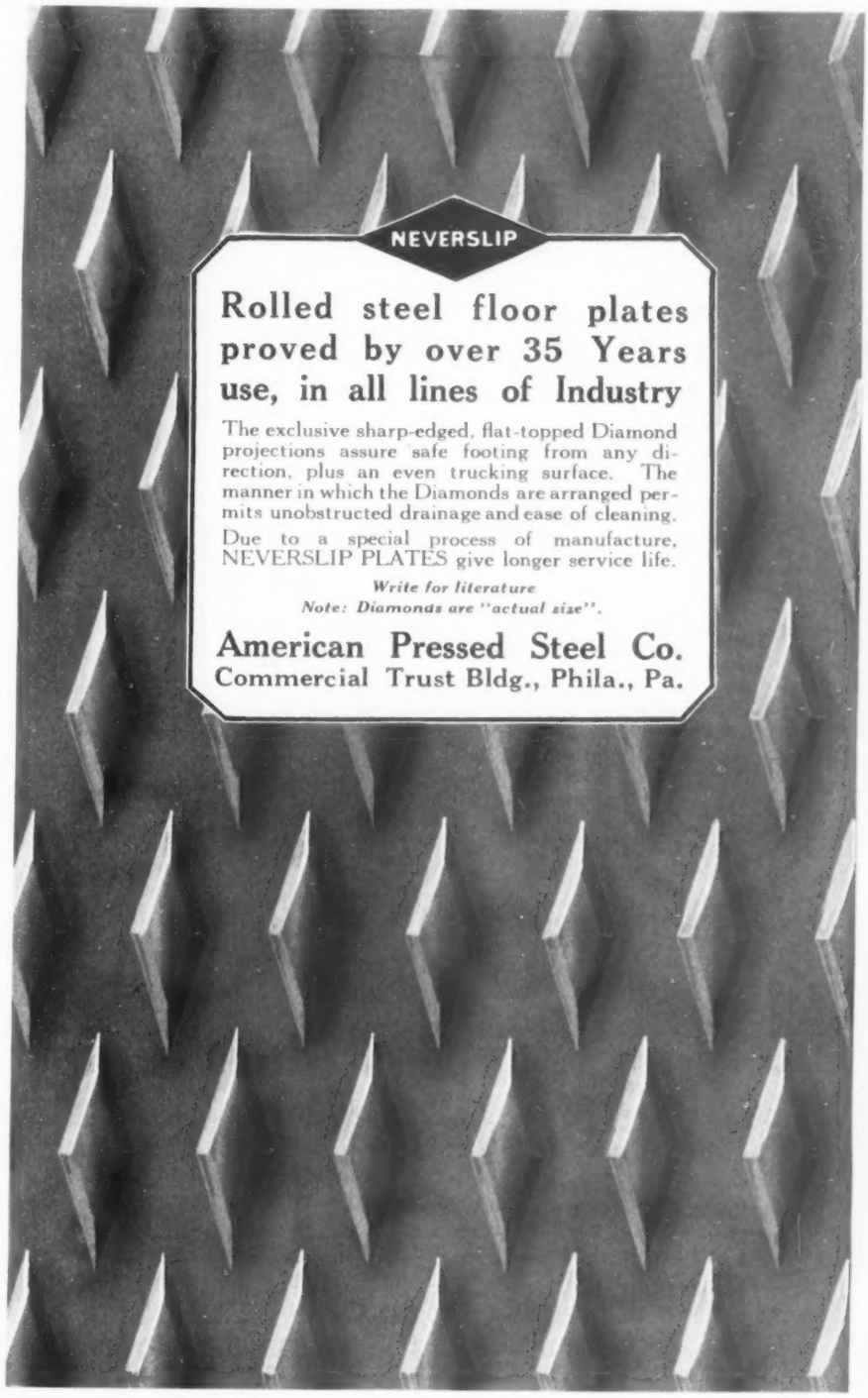
Tin Plate Prices, Page 152

Pittsburgh—If weather conditions over the country during the past ten days continue for another two weeks longer, a large amount of the tomato and corn crops will ripen and be canned. This will be reflected in a marked improvement in shipments of finished tin plate stocks in the hands of mills, which would be a welcome sign to producers. Operations in the tin mills, which were at 50-55 per cent last week, are difficult to forecast far in advance. Over the balance of 1935, it is expected that tin plate operations will be irregular and follow a downward trend. The 1936 contract price on tin plate will not be announced by producers much before six to eight weeks.

Semifinished

Semifinished Prices, Page 153

Several fourth-quarter contracts have been negotiated by important forging billet users at the advanced base price of $35 and at the changed base size, which is to be 6 x 6-inch. There has been some stocking of forging billets against this advance over the past few weeks but not to any significant proportion. Sheet mills are now exceeding the requirements of tin plate mills in the sheet bar market, probably the first time this year that tin plate rolling mills have yielded their dominating position. Pittsburgh base on sheet bars remains $28, and on rerolling billets, blooms, and slabs, $27. Common wire rods are quoted $38 and skelp, 1.70c. As previously reported, tube rounds are being sold on the bar base.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Write for literature
Note: Diamonds are "actual size".
American Pressed Steel Co.
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Pig Iron

Pig Iron Prices, Page 154

Pittsburgh—Adoption of quantity differentials in the pig iron market is considered a possibility, but this is not expected much before the fourth quarter at the earliest. At present, the only allowances openly given from Pittsburgh furnace base prices on pig iron are in 400-ton lots and over where water shipment entirely is specified and for delivery within the Pittsburgh district. Heavier pig iron buying activity in other districts has not been evident here, and barring the purchases of sanitary ware makers, the market is purely routine. Reflection of the boom in sanitary ware manufacture is seen in the anticipated carloadings for this group in the Pittsburgh district covering the fourth quarter where a 363 per cent increase is expected. District furnaces continue to quote $18, base, on basic iron, $18.50 for foundry, and $19 on bessemer iron. Bessemer iron requirements of a large nonintegrated steel mill in Ohio are now being served by a producer in this district.

Cleveland—Considerable forward buying is noted, which producers state is due mainly to the general expectation of higher prices. Actual shipments, however, show a consistent increase for automobile, agricultural implement, sanitary ware and machine tool manufacturers. For the month to date the gain is approximately 25 per cent over the same period in August. The Perry furnace of the Interlake Iron Corp., at Erie, Pa., was blown in last week after an idleness of five years.

Chicago—Pig iron shipments continue to show an increase of around 40 per cent over the rate a month ago, while new bookings remain the heaviest in years. Orders so far this month are two to three times as heavy as those received during the comparable second quarter period. While buyers have the possibility of a price increase in mind, in most instances iron now being bought is expected to be taken out and consumed during the balance of the year. Favorable operations continue among farm implement plants, while automotive and miscellaneous foundries are increasing schedules. The market continues $18.50, furnace, for No. 2 foundry and malleable.

Boston—A fair volume of pig iron for fourth quarter delivery has been booked with some increase in spot lots. Prices are firm on domestic grades. Imports of foreign iron during the last 10 days have been heavier, considerable being sold before arrival, including close to 1000 tons from India and several thousand tons of Dutch, part of the latter cargo going into storage at Providence, R. I. Most consumers in a position to cover have done so for the last quarter, but some will continue to purchase requirements as needed. The Everett, Mass., furnace stocks are rather well depleted and out of balance as to silicon content. Reports this furnace will not go in again are far fetched. Unofficial, but nevertheless reliable reports, are this furnace will go in again after repairs, although the date is indefinite.

New York—Lively consuming interest is noted in pig iron, although at the moment orders individually do not seem to be running as large as earlier in the month. Prices continue strong.

Philadelphia—A strong undertone prevails in pig iron, with consumers placing fair-size quantities. The general expectation is that prices will probably hold steady for the present but that any change later will be an advance. Much depends, in the opinion of some, upon early labor developments in the bituminous coal field. Cast pipe makers, normally the heaviest consumers of foundry

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iron in the district, are experiencing possibly the worst year since the depression set in, and as they have heavy stocks on hand, prospects for substantial purchases in these quarters are not encouraging.

Buffalo — Demand for pig iron is good although the larger inquiries which were numerous in mid-September have disappeared following liberal fourth quarter coverage by many consumers. Four or five barge loads of iron are going to seaboard this week from Buffalo furnaces which are trying to overcome the shortage in iron at storage piles.

Cincinnati—Ordering of pig iron for fourth quarter has slowed, with principal melters fairly well covered at the reaffirmed prices. Some inquiries, to usual sources of supply, are current so that further buying, in addition to spot orders, may be expected, especially if price increases appear assured.

Birmingham, Ala. — Market for pig iron continues steady with small lot orders predominating. Surplus stocks are being reduced slightly each week, but still are sufficient to allay fears of shortage for an indefinite period.

Toronto, Ont. — Sales gradually are increasing. The daily melt is about 45 per cent. Production also is holding at a high level with four stacks blowing. Prices are firm.

Scrap

Scrap Prices, Page 155

Pittsburgh—Substantiated by purchases and confirming a strong undertone, No. 1 heavy melting steel advanced 50 cents a ton last week to $13.50 to $14, hydraulic compressed sheets to $13.50 to $14, and railroad grade of heavy melting steel, $14.50 to $15. A district independent mill has been buying rails recently, first offering $14.50, later raising its price to $14.75, and ultimately paying $15 a ton, delivered. Activities of two down-river mills in seeking scrap are again a market feature, indicating mill purchases of better than $14 for both ordinary heavy melting and hydraulic compressed. Machine shop turnings for local delivery are quoted $9.75 to $10.25, and the low phos specialty items have moved up sympathetically. On a sale of iron car wheels at $14.50, this market is now quotable $14.25 to $14.75.

Cleveland — Some considerable tonnages of blast furnace material have been coming in by vessel from Chicago and Detroit to local steel interests. However, other grades of scrap, which are being held stiffly by local dealers, show continued signs of scarcity at present quotations. Some shipments are being made to outside points of heavy steel, pressed sheets, and borings. The market is up about 50 cents on billet and bloom crops, forge flashings, sheet bar crops, pressed sheets, and shoveling turnings; 25 cents on borings and No. 2 busheling; and $1 on railroad malleable and stove plate.

Chicago—Prices are steady in the face of a continued lack of interest on the part of mills in new purchases. Heavy melting steel continues $12.25 to $12.75, with sellers generally paying between $12.50 and $13 in covering old contracts. Bids on recent railroad lists range up to $13. Scrap is coming out in ample volume to fill mills' requirements, but cheap material generally is lacking.

Boston—Heavy melting steel for export is stronger with buying of both grades active against well sustained shipments. No. 1 at dock brings $9.75, establishing a 25 cents advance, while $8.50 to $8.75 is paid for No. 2. Consumers in New England are not meeting this price, $9, delivered, being offered for the bulk of material offered, although tonnage, if available might bring slightly more. No. 2 delivered in this district is slightly stronger, but still

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25 cents or slightly more below the export market, from $8.25 to $8.50, delivered, having been paid.

Philadelphia — An eastern Pennsylvania consumer has made a second recent purchase of No. 1 steel at $12.50, delivered, with the market now holding generally at this level. Advances have been made in several other grades, including low phosphorus punchings, grate bars, steel shafting, machine shop turnings and railroad wrought. Buying as a whole is still restricted to moderate sized tonnages. Little export tonnage is moving from here at present, with dealers' offering prices, wharf, too low to attract much scrap.

New York—Heavy melting steel scrap for rail shipment to eastern Pennsylvania at northern New Jersey continues to command higher prices than those paid at dock, New York City. Prices are steady and generally unchanged, with the upward trend temporarily halted. Buying for export is mostly against old contracts. From this district, other than for boat loading and eastern Pennsylvania, shipments are not heavy.

Buffalo — A local melter whose last purchase of No. 1 heavy melting steel was made at $11, now offers $12 for tonnage but has picked up only odd cars, according to dealers. The latter are asking $13 for No. 1 steel but no sales have been made at this level. Nominal markets prevail in other lines although dealers have ideas substantially in excess of prices at which last sales were made. Scrap receipts are very small and melt is increasing steadily.

Detroit—Cast and turnings grades are slightly stronger and have been advanced 25 to 75 cents. No. 1 steel remains $9.50 to $10, and bundles $10 to $10.50. The tide in production has turned, and as automobile and parts makers swing into new models, scrap offerings are increasing. The strong side still predominates in the market.

Cincinnati—Iron and steel scrap market tends stronger despite continued absence of tonnage contracting for the past few weeks. Miscellaneous demand is active and dealer sentiment, bolstered by nearby markets, is bullish in anticipation of mill ordering within a few weeks to meet needs of advancing steelworks operations.

Birmingham, Ala. — Consumption shows improvement, though not up to expectations. Quotations are unchanged for the week. Available stock is large, and producers of large quantities intimate some tonnage will be let soon. Heavy melting steel is held at $8.50 to $9.50.

Seattle — The situation is unchanged, domestic demand being restricted and Oriental buyers holding off. Exporting houses are preparing for an anticipated movement to Japan, although reports from that market indicate imposing stocks are still on hand. Bids will be received at Seattle Sept. 20 for the sale of 1200 tons of 40 to 90-pound steel rails, also locomotives, engines, hoists, rope and other logging equipment of the Nelson-Neal Lumber Co., Montborne, Wash.

Toronto, Ont. — Local iron and steel scrap dealers are revising buying price lists, and it is understood the new range will show advances of 50 cents to $1 per ton in practically all lines. The increase in price, however, is not with the idea of stimulating offerings, but is in keeping with an advance to consumers. Substantial tonnages now are going to mills and other consumers in the Hamilton district.

Cold Finished

Cold Finished Prices, Page 153

Pittsburgh—Full application by the middle of next week will have been effected on revised quantity extras for cold-drawn carbon steel bars.

★

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HOTEL CLEVELAND *Cleveland*

Rooms from $2.50 for one, $4 for two.

There has been no marked degree of stocking by consumers in anticipation of this change and buying of cold-drawn steel represents actual needs. A small degree of expansion is noted in automotive cold-drawn orders but not up to expectations.

Warehouse

Warehouse Prices, Page 156

Pittsburgh—Mill price advances in cold-drawn bars, which become effective Oct. 1, will be reflected shortly in a changed quantity method of quoting on warehouse cold finished. On 300-pound lots and under, the mill advance is especially noticeable in sizes such as $2\frac{7}{8}$ and $2\frac{3}{4}$ inches. Jobbing trade here eased off somewhat last week, but prices are steady.

Cleveland—Volume this month is slightly ahead of the comparable period in August. Price adjustments will be made Oct. 1 in accordance with recent mill announcements for fourth quarter.

Chicago — Sales are steady, the volume so far this month comparing favorably with that of August. A revision in bolts and nuts is in prospect, while announcement of changes in extras on bars and wire products is deferred. The latter changes likely will be instituted next month.

Boston—Warehouse sales are well maintained, day to day volume running slightly ahead of last month with most jobbers. Better demand for alloy and specialty steels has tended to improve the dollar totals. Buying of regular lines is well spread. Prices on most items are steady.

New York—Sales volume with warehouses holds to the current rate, but September will be slightly below August with most jobbers, last month being the best of the present year. Buying is well distributed and prices are unchanged, with several items easy, notably galvanized sheets, bolts and nuts. Pipe demand has improved, due largely to considerable buying for relief work projects.

Philadelphia—Jobbing demand is being fairly well sustained, with tonnage so far this month as good if not slightly better than August. While some early changes in schedules are anticipated in view of the revisions in mill extras on some products, warehouse prices momentarily are steady.

Baltimore—Jobbing demand has improved this month, with prospects encouraging for further gain this fall. Building has made increasing demands and there have been better manufacturing requirements. Prices are steady. However, some revisions are likely soon, to conform with mill changes recently announced, particularly in bars.

Detroit — Warehouse business in iron and steel is holding up to the August level, which is seasonally high. Some price adjustments may be made Oct. 1 in conformity with recent mill changes.

Seattle—Volume has been increased by repair and replacement orders from logging and lumber sources. Market is spotty and no large tonnages moved last week. Alaska continues an active customer. Prices are steady.

Cincinnati—Sales from warehouse this month are in increasing volume, individual orders during the past week turning heavier. Building materials are more active.

Ferroalloys

Ferroalloy Prices, Page 154

New York—Quarterly contracting in ferromanganese is more in evidence, with prices unchanged at $85

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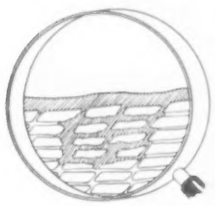

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duty paid, Atlantic and Gulf ports. Sellers look for an even better period over the remaining three months than they experienced in the quarter now closing. Domestic spiegeleisen, 1 to 21 per cent, is unchanged at $26, Palmerton, on lots up to 50 tons, and $24 on 50 tons and over.

Metallurgical Coke

Coke Prices, Page 153

Foundries dependent upon Connellsville, Pa., foundry coke are showing a preference for the premium grade and the market has firmed up to a top of $5.35 a ton, as against $5.00 to $5.10 previously. The common grade of Connellsville foundry coke remains $4 a ton and furnace grades, $3.25 to $3.40. Coke buyers are anticipating their demands a little more freely in view of the constant threat of coal strike.

Coke production at Birmingham, Ala., is steady. Quotations still are on $6 per ton, foundry, base.

At Chicago, foundry coke shipments have increased sharply, deliveries so far this month being about 50 per cent ahead of August. This is partially a reflection of increased foundry operations, though a share of the gain is ascribed to speculative buying in anticipation of higher prices. Contracting is done only on a monthly basis, with quotations for October yet to be established. The market for the balance of this month remains $8.50, ovens, for outside delivery and $9.25, delivered Chicago.

Iron Ore

Iron Ore Prices, Page 155

Cleveland—Consumption of Lake Superior iron ore in August, 2,615,927 tons, was 417,738 tons more than in July, according to the Lake Superior Iron Ore association. Its report on consumption and stocks follows:

	Tons
Consumed in July	2,198,189
Consumed in August	2,615,927
Increase in August	417,738
Consumed in August, 1934	1,443,943
On hand at furnaces Sept. 1, 1935	26,935,791
On Lake Erie docks Sept. 1, 1935	4,554,923
Total Sept. 1, 1935	31,490,714
Total Sept. 1, 1934	32,674,318

The number of lake vessels in commission Sept. 15 was 178, four more than Aug. 15, and of these 160 were engaged in carrying iron ore, 7 more than on Aug. 15.

Iron ore receipts at Lake Erie ports in August were 3,481,613 tons, against 3,091,871 tons a year ago. For the season to Sept. 1, receipts totaled 12,005,778 tons; a year ago, 11,039,201 tons. Receipts, shipments and dock balances at Lake Erie ports follow:

Port	August Receipts	August Shipments	Dock Balance Sept. 1
Buffalo	305,305	1,172	2,661
Erie	202,936	206,928	83,962
Conneaut	671,404	556,028	1,713,874
Ashtabula	459,906	342,755	1,318,192
Fairport	152,518	154,240	387,985
Cleveland	1,011,992	700,006	659,357
Lorain	348,724	199,800	12,527
Huron	145,305	107,037	365,560
Toledo	183,523	124,397	11,705
Total	3,481,613	2,392,363	4,554,923
Comparative 1 Year Ago	3,091,871	1,947,921	4,855,814

Receipts at other than Lake Erie ports were:

Port	August	Season
Detroit	121,940	611,896
Indiana Harbor	243,753	990,053
Gary	321,498	1,054,859
South Chicago, local fces.	468,157	1,779,443
Sault Ste. Marie, Ont.	76,170	141,159*
Hamilton, Ont.	29,902	198,868
Total	1,261,420	4,776,278
Comparative 1 Year Ago	1,146,684	4,070,816

Behind the Scenes with STEEL

All Yours

YOU now have in your hands that second extra September dividend which we were talking about several weeks ago—the spashal issue devoted to the National Metal Congress and Exposition in Chicago, Sept. 30-Oct. 4. It strikes a new high in Metal Show issues since the good old days. Take our word for it that the congress and exhibition will strike a new high as well.

* * *

Ho, Metallurgists

CALLING all metallurgists! Take a tip from us and turn back to page 52 in this issue. Between 52 and 53 you will notice a specially prepared hardness conversion chart that should make a handy addition to your office wall or desk top. By referring to it, you can tell in a flash that 40 Rockwell C is equivalent to about 112 Rockwell B or 55 Scleroscope or 375 Brinell, and so on ad infinitum.

We have a few extra copies available and if you approach our circulation department in the right way, they will see what they can do about getting you some at nominal cost. Act today! Avoid that embarrassing moment when the vice president steps into your office and says: "Quick, Sammy, how much is 450 Brinell in Scleroscope and vice versa?"

If you want to remove the chart from this issue grasp it firmly and pull gently. It snaps right out.

* * *

Hike

IT WAS not until after we had walked around the Machine Tool Show in Cleveland last week about three or four times that some kind-hearted soul told us statisticians had figured it a jaunt of some 21 miles if you trekked completely around the show and strolled past each machine in each booth. With 40,000 visitors at the show, most of whom probably covered the entire route, we figure that 840,000 miles were covered, nearly 34 times around the earth. But no one we talked to denied it was the greatest show they had ever attended.

* * *

Slick!

A NOGGIN of praise to those responsible for the 4-page insert of the United States Steel Corp. subsidiaries in the Sept. 9 issue of STEEL. *In addition to top-notch eye-arresting value, good copy, good art, the highly varnished insert actually felt good to the fingers, and, believe it or not, had a pleasant odor about it.*

There's an idea for advertisers. Use scented inks and varnishes, thereby making it possible to take your readers not only by the eyes but also by the well-known schnozzolas! For instance, a manufacturer of spring steel might have his advertising page gently sprayed with Coty's Flowers of Spring, or should it be Fleurs de Printemps?

* * *

Ink, Red

NEWS dispatches from Albany, N. Y., report that a distinct depression is developing in red ink, sales having fallen off nearly 25 per cent in the last six months. Interpreting these figures, it must be that a parallel increase of 25 per cent in sales of black ink has been registered, and ledgers once more are assuming that hue which makes treasurers rub their hands in glee. One man's cooky is another man's arsenic, as the saying goes.

* * *

News from Home

LIFE becomes pretty complicated at times, what with printers shouting for copy, artists yelling for instructions, shoes pinching your feet, babies crying, telephones ringing, the 5:15 leaving at 5:14½, and other tribulations. In times like this, we often wish for a quiet office in Bourbon, Ind., where we could while away the hours writing news dashes for the *News-Mirror* in that village, such as this one we saw recently:

HANGS HEAD-DOWN, UNCONSCIOUS FROM AN ELECTRIC SHOCK

Knocked from his precarious position in a tall tree, on the Presbyterian church lawn in Warsaw, that he was engaged in trimming the limbs from, when his hand came in contact with a telephone wire that was highly charged with electricity from a power line that the telephone line touched, Cecil Peterson, of Roann, was caught in the forks of a limb of the tree, held there by one leg, unconscious until he could be rescued.

* * *

Itch

ANYBODY have ideas for another contest? This department is just itching to throw out some more tantalizing bait to our hungry readers. We've corralled five dollars to give out as first prize, but we can't seem to figure out a worthy competition. How about it?

—SHRDLU

Issues Revised Extras on Alloy and Special Steels

Youngstown—Republic Steel Corp., through its alloy steel division, Massillon, O., has issued a new set of standard classifications of extras on hot rolled alloy and special steels, dated Sept. 2. These extras apply on ingots, blooms, billets, slabs, bars, bands and spring sizes. A few changes in extras have been made, some upward and some downward; but none is declared to be radical. In fact, the new publication is said to be merely the shaping up of alloy and special extras which have been applied throughout the industry for some years past.

Coke By-Products

Coke By-Product Prices, Page 153

New York — Distillates are the most active coke oven by-products at firm and unchanged prices. Toluol and xylol production is going directly into consuming channels, mostly against contracts, with spot buyers having difficulty in securing material from some distributors. Benzol is also active. Small spot buying predominates in a slow napthalene market and contracting for next season's needs of sulphate of ammonia progresses slowly. Phenol buying is steady, but not heavy. Prices are unchanged.

Nonferrous Metals

Nonferrous Metal Prices, Page 154

New York—Active demand, advancing prices and uncertainties ordinarily encountered in a market under pressure in various directions served to contribute an air reminiscent of pre-depression days in nonferrous metal markets last week.

Copper—Electrolytic jumped 10 points to 9.00c, Connecticut, following very active demand. Sales were lighter at the higher level, however. The rise was also attributed both to the war scare abroad and to the fact that world stocks were cut about 19,500 tons in August. Metal for export shot up to as high as 8.70c, c.i.f., the highest level since July 21, 1933.

Lead—Prices advanced $3 per ton to a basis of 4.50c, New York, and 4.35c, East St. Louis. Bookings from all classes of consumers were heavy.

Zinc—Prime western zinc advanced $3 a ton also to 4.75c, East St. Louis. Other grades were proportionately higher. An unusually heavy volume of business was reported by all sellers. The statistical position of the industry is steadily improving.

Tin—Trading was dull with only a few small lots reported sold. Daily price fluctuations were based on the London market and Sterling exchange. Prices eased to fractionally above the 49-cent level.

Antimony—Little metal moved last week but prices advanced to the basis of 13.75c, duty paid, for Chinese spot. The advance was attributed to the situation in China which has tightened considerably by the threatened war abroad.

Steel in Europe

Foreign Steel Prices, Page 156

London—(*By Cable*)—Inquiries for large quantities of galvanized sheets for Italian Somaliland are numerous.

Continent reports a lull in buying due to political uncertainty, and export business is confined mainly to

CHECK THESE PROFIT POINTS

- - in Morrison heating equipment

- Twice former oven production with same or less fuel per hour.
- Up to six times speed of former methods in bringing charge to full heat.
- Absolute uniformity of temperature plus extremely accurate control.
- Oven atmosphere exactly maintained through adjustment of only one burner.
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What would your profits be if the important expense of heat treating were cut in half? Let us point out the opportunities Morrison heating equipment provides.

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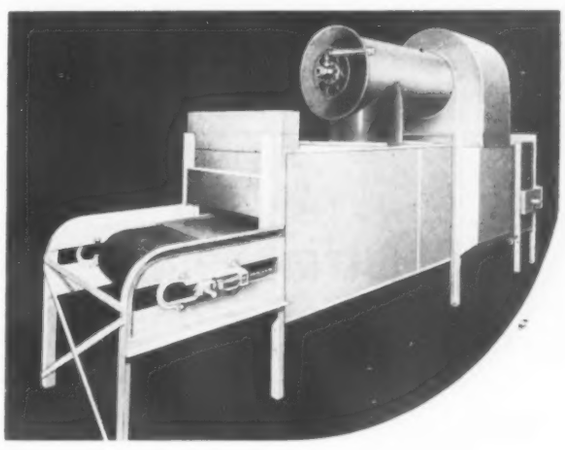

Through its revolutionary economies, Morrison equipment has often paid for itself easily within the first year of its operation. To the right is an efficient continuous heat treating unit, engineered by Morrison experts for high production.

demand from Scandinavia and South America. Belgian steelworks are transacting a fair volume with Soviet Russia.

In Great Britain, steel specifications are increasing, especially joist sections and plates for shipbuilding and engineering. Pig iron demand is heavy, with orders covering output of furnaces for many months.

August imports totaled 74,314 gross tons, compared with 90,250 in July, a decline of 15,936 tons. Exports were 202,497 gross tons, against 205,741 tons in July, a decline of 3244 tons.

Allegheny Offers Stainless Architectural Tubing

Allegheny Steel Co., Brackenridge, Pa., has recently announced a new stainless steel product known as "Allegheny metal architectural tubing," and is now prepared to make the following round o.d. sizes: ⅝-inch, ¾-inch, 1-inch, 1¼-inch, 1½-inch, and 1.9-inch. Certain sizes of square and rectangular shapes will also be produced.

This new product is thin-wall stainless tubing, with or without carbon steel inserts which are fabricated into the tube when applications demand additional strength and rigidity.

Selling price of the tubing is approximately one-fourth the price of seamless stainless tubes for the corresponding size, according to the company, and applications in hand rails, foot rails, metal furniture, etc. are being made. The company reports it has already booked several thousand feet of this new product.

For Immediate Liquidation--

MODERN STEEL FABRICATING PLANT

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LAND, BUILDINGS, MACHINERY and EQUIPMENT

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WILLIMANSETT, MASS.
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consisting of:

Overhead Cranes; Gantrys; Electric Hoists:

20 Ton Niles Bement Pond Overhead Crane; 90′ span, A.C.
(2) 10 ton Niles Bement Pond Overhead Cranes, 57′ 3½″ span, A.C.
(2) 5 ton Palmer Gantry Cranes, 15′ 8″ span; hand chain traveler.
(2) 3 ton Shepard Electric Hoists.
(1) 4 ton Shepard Electric Hoist.
(1) 1 ton Yale & Towne Elec. Hoist.
(4) 3 ton Hand Traveling Cranes; I-beam type, 20′ span.

Steel Fabricating Machinery:

30″ Cleveland Rotary Planer, table 24″x60″.
Cleveland single end Punch, 15″ throat, size E.F.
8″x6″x1″ Cleveland Double Angle Shear.
14″ Espen Lucas Column Facing Machine.
48″ Ryerson Power Friction Cold Saw.
60″x1¼″ Cleveland Plate Shear, 15″ throat.
Cleveland Double End Punch and Shear, size E.F., architectural jaws; throats 24′ and 17″.

Machine Shop:

48″x48″x10′ Detrick & Harvey Openside Planer; 2½″x36″ Marvel Lodge & Shipley geared head Manufacturers Lathe; 5′ Western Plain Radial Drill.
(3) 15′ Lincoln Wall Radial Drills; also: Grinders; drills; hack saws; lathes.

Welders: Rivet Heaters: Riveters:

800 Amp. G.E. Multiple Operator Arc Welder; 250 KVA Gibbs Spot Welder, 26″ arm; 15 ton, 25 ton and 50 ton, Hanna Portable Riveters; Electric A. C. F. Rivet Heaters, 1″ cap.

Air Compressors:

8″x12″x13″x12″ Ingersoll Rand type 10 75 H.P. motor serial No. 83033.
12″x10″ Ingersoll Rand Class E.R.1;

also:

Complete office furniture and equipment; structural steel; rails; runways and other items too numerous to mention.

Representative at Plant daily—Make your inspection at once—An opportunity to purchase modern equipment at bargain prices. ALL EQUIPMENT MOTOR DRIVEN WITH 3 PH., 60 CY., 440 VOLT MOTORS.

Send for detailed, descriptive circular

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Toledo, Ohio **Columbus, Ohio**

Schwartz To Talk Scrap Before Foundrymen

Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, New York, has accepted an invitation to deliver a lecture on scrap before the Chicago chapter of the American Foundrymen's association. The lecture, which will be delivered on Nov. 11, at the Lewis institute in Chicago, will cover the selection and classification, as well as other problems, of scrap, both ferrous and nonferrous, used in foundry practice.

Mr. Schwartz's talk is one of six lectures constituting a course arranged for the foundry industry in Chicago district. The first lecture will be on refractories; the second, on molding sand; the third, on fuels; the fourth, on scrap; the fifth, on alloys; the sixth, on customers' inspection of foundry products.

IMPORTS SHOW DECLINE

German imports of machinery declined materially in the second quarter, while exports remained stationary, according to Assistant Trade Commissioner Roland Welch. Imports in the quarter were valued at 8,836,000 reich marks ($3,534,400). Exports in the second quarter were valued at 105,850 reich marks ($42,340).

Equipment

New York—Orders for machinery have increased, the first reaction from the Cleveland show with indications much more volume will be closed within the next few weeks, including business developed at the exposition and releases of other lists held up for the event. Dealers in many instances have not benefited to the extent attained by some builders who sell direct.

Chicago—Machine tool sellers anticipate a definite upturn in business within the next few weeks in view of the interest evidenced by buyers in equipment displayed at the Cleveland

exposition. Early action on a number of pending purchases is promised. Among recent tool lists is one from the Milwaukee road involving eight tools for various shops. Electro-Motive Corp. is preparing to take delivery soon on most of the larger equipment ordered for its new plant, but still has a number of small tools to buy.

Steel plant purchases of lighter equipment continue limited. Small tool buying is fairly steady. Farm implement manufacturers are counted on for additional equipment business, some inquiries being expected soon from International Harvester Co. in connection with expansions at various plants. Foundry equipment demand remains fairly active.

Boston—New England machine tool builders, booking substantial volume at the Cleveland show, in numerous instances have heavy backlogs for full-time operating schedules several months ahead. Bulk of this business is for special machinery of the high-production type, largely tools brought out comparatively recently. For several weeks incoming orders have been more for standard units and parts, mostly from government shops and yards. The trend has now shifted, however. In some centers there is a shortage of skilled mechanics and foundry help with indications that delivery problems will become more acute. Bids close this week on five milling machines for the naval station, Newport, R. I.

Seattle—Demand for both new and used equipment continues strong. Resumption of lumbering has strengthened this market while Alaska is still buying equipment and machinery for mining projects. Spokane machinery dealers report business 30 per cent better than a year ago. Puget Sound navy yard opened bids Sept. 16 for two 3-ton electric hoists.

Convention Calendar

Sept. 23-27—American Mining Congress. Annual convention and exposition at Palmer House, Chicago. Julian D. Conover, 439 Munsey building, Washington, is secretary.

Sept. 24-26—Association of Iron and Steel Electrical Engineers. Annual convention and exposition at William Penn hotel, Pittsburgh. T. B. Little, Empire building, Pittsburgh, is acting managing director.

Sept. 30-Oct. 4—American Institute of Mining and Metallurgical Engineers. Fall meetings of Iron and Steel and Institute of Metals divisions in Chicago. John T. Breunich, 29 West Thirty-ninth street, New York, is assistant secretary.

Sept. 30-Oct. 4.—American Society for Metals. Seventeenth annual National Metal congress at Palmer House, Chicago. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is secretary.

Sept. 30-Oct. 4—American Welding society. Fall meeting in Chicago. M. M. Kelly, 33 West Thirty-ninth street, New York, is secretary.

Sept. 30-Oct. 4—National Metal exposition. Seventeenth annual, in International Amphitheater, Chicago. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is general manager.

Sept. 30-Oct. 4—Wire association. Annual meeting at Congress hotel, Chicago. Richard E. Brown, 17 East Forty-second street, New York, is secretary.

Oct. 14-15—American Gear Manufacturers' association. Semiannual meeting at General Brock hotel, Niagara Falls, N. Y. J. C. McQuiston, Penn Lincoln hotel, Wilkinsburg, Pa., is secretary-manager.

Oct. 14-17—American Gas association. Seventeenth annual convention at Palmer House, Chicago. Alexander Forward, 420 Lexington avenue, New York, is managing director.

Oct. 16-18—American Institute of Steel Construction. Thirteenth annual convention to be held at Greenbrier hotel, White Sulphur Springs, W. Va. V. G. Iden, 200 Madison avenue, New York, is acting secretary.

Nov. 12-15—International Acetylene association. Thirty-sixth annual convention at Hotel Cleveland, Cleveland. H. F. Reinhard, 30 East Forty-second street, New York, is secretary.

Nov. 18-20—National Foreign Trade council. Twenty-second convention in Houston, Tex. Lindsay Crawford, 26 Beaver street, New York, is secretary.

Nov. 20-21—National Founders' association. Thirty-ninth annual meeting at Waldorf-Astoria hotel, New York. J. M. Taylor, 29 South La Salle street, Chicago, is secretary.

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Activities of Steel Users and Makers

CARBONDALE MACHINE CORP., Harrison, N. J., recently reorganized as a subsidiary of Worthington Pump & Machinery Corp. to cover the manufacture and sale of all classes of refrigeration, ice manufacture and air conditioning equipment, has announced officers and directors as follows:

President, H. C. Ramsey; vice president, H. A. Feldbush; vice president in charge of sales, A. H. Baer; secretary-treasurer, A. L. Prentice; assistant secretary and assistant treasurer, W. Lehman and F. D. Talmage; comptroller, C. A. Packard; directors: Messrs. Ramsey, Feldbush, and Baer, and H. C. Beaver, Hugh Benet, C. E. Searle, and C. E. Wilson.

◆ ◆ ◆

Steel Sales Corp., 129 South Jefferson street, Chicago, for many years maintaining a sales office in St. Louis, has recently opened a warehouse located at 4067 Park avenue. In addition to steel, the company distributes numerous nonferrous metals, including brass, copper, nickel silver, phosphor bronze, monel metal, pure nickel and zinc. Complete facilities have been installed to supply these materials cut and sheared to customers' specific requirements.

◆ ◆ ◆

Fansteel Products Co. Inc., 44 Twenty-second street, Chicago, has changed its name to Fansteel Metallurgical Corp.

◆ ◆ ◆

Charles A. Strelinger Co., Detroit, has been appointed agent of the General Refractories Co., Philadelphia, in the Detroit territory.

◆ ◆ ◆

Surface Combustion Corp., Toledo, O., has booked orders for equipment totaling $1,000,000, annealing furnaces for the Bethlehem Steel Corp., Bethlehem, Pa., accounting for half. The Toledo plant is working a night shift.

◆ ◆ ◆

General Mfg. Co., Detroit, has appointed the Cleveland Duplex Machinery Co., Penton building, Cleveland, its exclusive representative for the sale of its general flexible power presses and shaft straightening attachments in northeastern Ohio.

◆ ◆ ◆

Allegheny Steel Co., Brackenridge, Pa., has averaged a higher rate of operation during the third quarter to date than for any previous period this year, with unfilled orders sufficient to maintain the present rate of operation through September at least, according to W. F. Detwiler, executive vice president.

◆ ◆ ◆

Smith Facing & Supply Co., 1857 Carter road, Cleveland, has been appointed distributor for the Knefler-Bates Co., Indianapolis, in north central Ohio and northeastern Pennsylvania. Charles S. Tanner Co., 244 South Water street, Providence, R. I., will handle the sale of the core binder produced by the Knefler-Bates Co. in the New England states.

◆ ◆ ◆

Edward G. Budd Mfg. Co., Philadelphia, reports an increase of 45 per cent in the purchase of ordinary automobile steel and 33 per cent in stainless steel purchases to Sept. 15 compared with the corresponding period of last year. The automobile steel was used in the manufacture of car bodies and the stainless steel in the production of streamlined, lightweight trains.

◆ ◆ ◆

L. A. Young Spring & Wire Corp., Detroit, has completed construction of its second branch plant to be located in the Clearing industrial district, Chicago. The new branch will be given over to the manufacture of high carbon steel coil springs for the Illinois, Indiana, Wisconsin and

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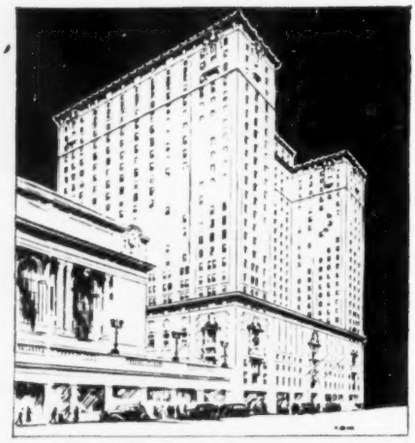

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♦ ♦ ♦

Tennessee Products Co., Nashville, Tenn., has opened an office in the Pittsburgh district at 920 Empire building, Pittsburgh, in charge of R. E. Lewis.

♦ ♦ ♦

Walter S. Aylsworth, Pittsburgh representative for the Charles Taylor Sons Co., manufacturer of insulating and refractory brick, announces removal to larger quarters located in the Martin building, Pittsburgh.

♦ ♦ ♦

Clark Controller Co., Cleveland, has appointed the Harris-Green Co., Farmers Bank building, Pittsburgh, as sales engineering representative. The Pittsburgh branch office of the Clark company will be maintained as at present.

♦ ♦ ♦

American Solder & Flux Co., Wayne avenue and Berkley street, Philadelphia, has been appointed representative by the Maluminum Co., Indianapolis, for the sale of foundry fluxes in Delaware, Maryland, western New Jersey and eastern Pennsylvania.

♦ ♦ ♦

Rawlplug Co. Inc., New York, has opened an office at 1907 Canton street, Dallas, Tex., where a stock of its complete line of Rawlplugs, Rawlanchors, Rawldrives, Rawldrills, crowners, and Lok-crowners will be carried. This branch will be known as the Rawlplug Dallas Co., and will be in charge of D. P. Fletcher. The entire northern section of Texas will be serviced.

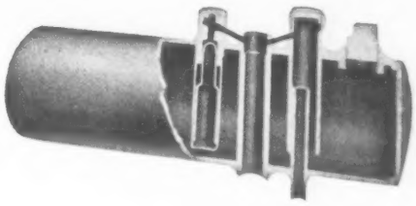
♦ ♦ ♦

Titusville Iron Works Co., Titusville, Pa., a division of Struthers-Wells-Titusville Corp., has secured the manufacturing and sales rights for the Master line of scrubbers, separators and mixer heads, except in the state of California. The Master line has been extensively used by the petroleum, chemical, utility and allied industries, especially upon the west coast where it originated in 1923.

♦ ♦ ♦

American Optical Co., Southbridge, Mass., manufacturer of safety goggles and many other products, has acquired a substantial interest in the Spencer Lens Co., Buffalo, which manufactures microscopes, microtomes, projection and other apparatus. The business of the Spencer company will continue to be operated under the same name, policies and personnel, with executive offices and manufacturing plant at Buffalo, as at present.

CROSBY STAMPINGS



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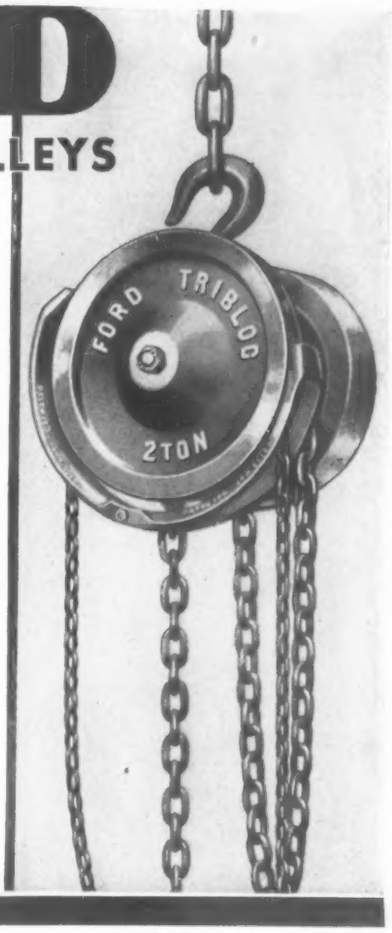

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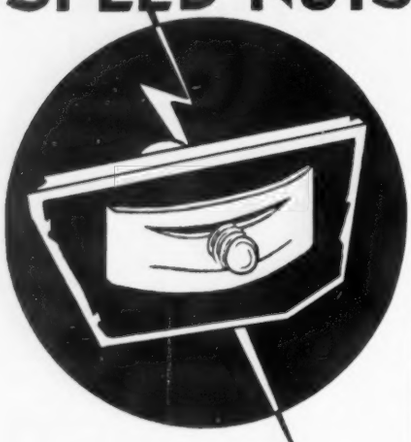

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Construction and Enterprise

Michigan

ALBION, MICH.—City council will ask WPA for a 45 per cent grant towards the construction of a proposed $650,000 municipally-owned electric power plant.

ALMA, MICH.—Acme Refining Co. is taking figures on materials for the construction of refinery buildings, costing $50,000.

BIRMINGHAM, MICH. — City, H. Allen mayor, retained Francis Engineering Co., Eddy building, Saginaw, Mich., to prepare preliminary surveys for municipal electric light and power generating plant. Cost will exceed $100,000.

DETROIT — Crane-McLean Motor Sales Inc. has been incorporated to do miscellaneous manufacturing, by Michael L. Crane, 2340 West Grand boulevard.

DETROIT—Standard Reamer & Tool Co., 3620 Elmwood avenue, has been incorporated to deal in steel tools, by Frank J. Trippensee, Route No. 1, Walled Lake, Mich.

DETROIT—Structural steel bids are being taken by Giffels & Vallet Inc., L. Rosetti, Detroit associated engineers and architects, for the new factory and power house to be erected in Detroit for the Ferro Stamping & Mfg. Co., 1367 Franklin street.

FLINT, MICH.—A threefold expansion program involving an expenditure of approximately $500,000 has been undertaken at Flint by the Chevrolet Motor Co., Fisher Body Corp. and the Grand Trunk railway. An addition will be erected at the Fisher Body plant No. 2, increasing its plant space by 50 per cent; a new hospital will be erected at the Chevrolet plant and electric power equipment at the same plant will be extensively realigned; and two concrete bridges will be erected by the Grand Trunk railway to provide additional transportation facilities for these plants.

GRAND RAPIDS, MICH.—Automatic Packaging Machinery Co. has been incorporated with $50,000 capital, to manufacture packaging machinery, by Harry D. Marshall, 549 Alabama avenue, Northwest.

JACKSON, MICH.—American Ceramics & Specialty Corp., 654 Hupp avenue, has been incorporated with $25,000 capital stock, to do general manufacturing, by Harry D. Boardman, Jackson, Mich.

KALAMAZOO, MICH.—Master-Craft Corp., Leo L. Allyn president and general manager, is expanding and adding new equipment to its plant, preparatory to greater production.

OWOSSO, MICH.—City has filed application for a federal appropriation to complete the water softening plant at the city waterworks. Cost is estimated at $100,000.

WYMAN, MICH.—Sweet Oil Refining Co. is planning to construct a 1200-barrel topping unit at its refinery here. Max Pray is head of the company.

Ohio

CHAUNCEY, O.—Municipality plans waterworks system. Cost will exceed $25,000. Burgess & Niple, 568 East Broad street, Columbus, O., engineer.

CINCINNATI—Reliable Pattern & Castings Co., 2822 Spring Grove avenue, is planning to move soon after Oct. 1 to a building at 3530 Spring Grove avenue. The structure is 1-story, 60 x 200 feet and provides 15,000 square feet of space. An adjoining lot, 40 x 200 feet, has been acquired for expansion purposes.

CLEVELAND—Cleveland & Sandusky Brewing Co., O. J. Fishel, president, 2764 East Fifty-fifth street, plans to erect a brewery building at a cost of $40,000.

COLUMBUS, O.—Automatic Circuit Breaker Co. will seek permit to construct factory addition. Cost estimated between $65,000 and $100,000.

GRAFTON, O.—Village, E. E. Arnold president, Board of public affairs, will hold an election to vote on bonds, and will apply for PWA loan, for erection of 1-story steel power plant, including installation of three diesel engines, generators, water cooler, and oil tanks. Cost estimated at $45,000. Hadlow & Elwell, 5005 Euclid avenue, Cleveland, engineers.

LORAIN, O.—Lorain Castings Co. plans plant additions to replace burned building. Cost will exceed $28,000, with equipment. (Noted Sept. 9).

NEWARK, O.—Furnas Ice Cream Co. has purchased a site here and plans construction of a modern dairy and ice cream plant. Cost estimated at $200,000.

Illinois

CHICAGO—Fort Dearborn Brewery Inc., 2762 Archer avenue, has been incorporated to conduct a brewery, by James C. Reber, C. K. Reber and William Sabath. Correspondent: Bull, Lytton & Olson, 134 North LaSalle street.

CHICAGO—Continental Can Co., 100 East Forty-second street, New York, plans to erect a $1,000,000 can manufacturing plant adjacent to its present factory on South Ashland avenue here. The building is to be of reinforcing concrete, occupying about 160,000 square feet of floor space, and equipped with 16 complete lines of can manufacturing equipment.

LASALLE, ILL.—City plans construction of light and power plant. Cost estimated at $750,000, including equipment. Revenue bond issues have been approved by voters.

MACOMB, ILL.—Hemp Co., manufacturer of sheet metal products, whose factory was partly destroyed by fire in July, has purchased the east factory of the Dickey Clay Mfg. Co. The plant consists of a large 3-story brick building with approximately 135,000 square feet of floor space.

NORTH CHICAGO, ILL.—Abbott Laboratories, Fourteenth street and Sheridan road, will soon let contract for constructing 2-story plant addition, costing $100,000, with equipment.

Indiana

AUBURN, IND.—City will soon take bids for 61 x 87-foot steel municipal waterworks and electric plant. L. Bradley, 221 West Wayne street, Fort

Wayne, Ind., architect. C. McClinsock, city engineer.

LYONS, IND.—Town board, H. F. Ferguson president, will soon take bids for pumping station, deep well, 150 gallon-per-minute turbine pump, 60,000-gallon elevated steel tank. O. T. Hancock, Plainfield, Ind., engineer.

Connecticut

WEST HARTFORD, CONN.—C. E. Isleib, 304 Newington road, is preparing plans for a 1-story, 50 x 150-foot steel factory. Cost estimated at $28,500.

New York

BUFFALO—William C. Carr Corp., manufacturer of air-conditioning apparatus, is removing its production from New Britain, Conn., having leased office and factory space here.

NEW YORK—Zarkin Machine Co. has leased space at 335 East Twenty-seventh street.

NEW YORK—Knickerbocker Ice Co. plant at Powell street and Dumont avenue, Brooklyn, sustained severe damages by fire which started in the engine room.

YOUNGSTOWN, N. Y.—Village is completing plans and will soon take bids for water filtration plant and dock. Cost $40,000. J. Fruchtbaum, 154 West Huron street, Buffalo, engineer.

New Jersey

BLOOMFIELD, N. J.—Delco-Remy Corp., F. C. Kroeger, care of General Motors Corp., General Motors building, Detroit, plans to alter and equip the former LaFrance Republic plant for storage battery manufacturing.

Pennsylvania

HAYS, PA.—P-K Construction Co., 30 East General Robinson street, Pittsburgh, has begun work on the oil storage terminal here for the American Oil Co., American building, Baltimore. Total expenditure involves about $300,000 and includes tanks, docks, warehouse and garage. Tanks will provide storage capacity for 4,000,000 gallons of gasoline.

District of Columbia

WASHINGTON—Bureau of reclamation, interior department, has been allotted $5,000,000 for completion of the Roza division of the Yakima reclamation project. This allotment will provide for construction of a diversion dam, 99 miles of main canal, siphons, 500 miles of laterals, and construction of a 12,000-kilowatt hydroelectric plant.

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids Sept. 27, schedule 5969, two motor-driven engine lathes; schedule 5970, one motor-driven abrasion grinding machine, all delivered Mare Island, Calif.; schedule 6003, one motor-driven, drilling and milling, horizontal boring machine, delivered Norfolk, Va.; schedule 6009, milling machines, delivered Newport, R. I.; Oct. 4, schedule 6008, pumping units, delivered Puget Sound, Wash.

Georgia

ATHENS, GA.—City, Lon G. Dudley mayor, has grant of $42,750 from PWA for water works, erecting filtration plant and pumping station of 5,000,000 gallon daily capacity. Total cost $95,000.

GRIFFIN, GA.—City has grant of $50,000 from PWA for constructing two sewage disposal plants.

MONTICELLO, GA.—City has grant

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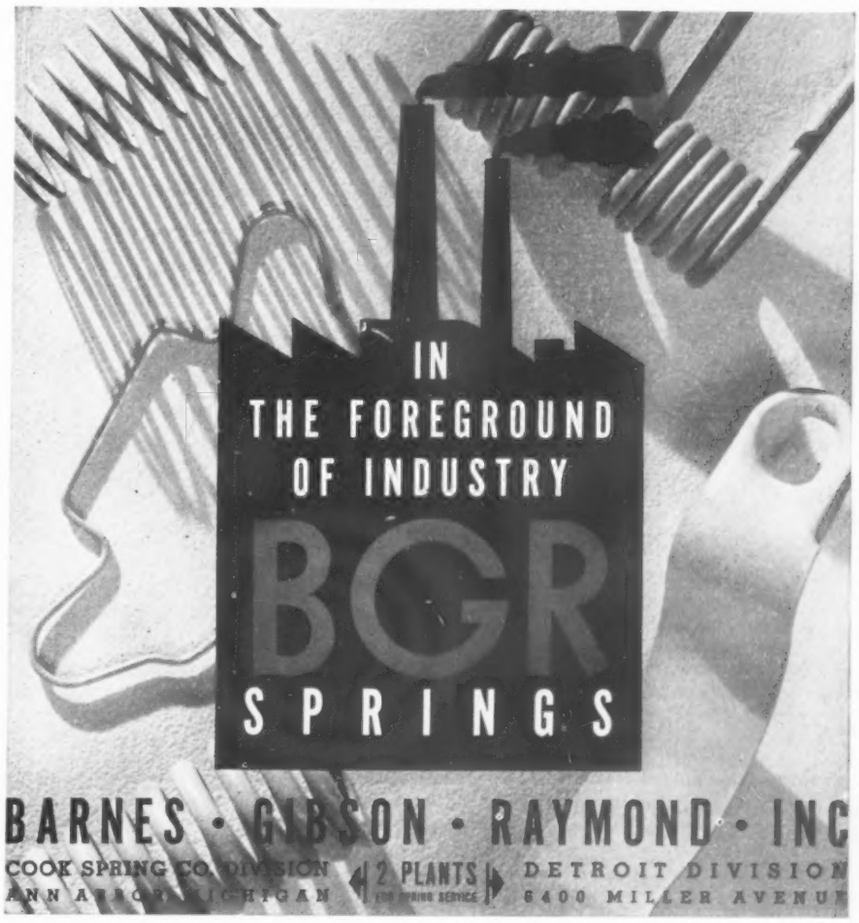

of $36,000 from PWA for three sewage disposal plants and sewage systems; total cost $80,000.

RINGGOLD, GA.—City plans waterworks system, including tanks, mains, valves, pump, pump house, etc. Robert & Co., engineer, Bona Allen building, Atlanta, Ga.

ROSWELL, GA.—City applied to PWA for loan to install complete waterworks system, costing approximately $65,000. N. R. Rucker, engineer.

Mississippi

BILOXI, MISS.—City submitted plans through A. G. Adler, Birmingham, Ala., to PWA for loan of $600,000 for municipal power plant.

North Carolina

GREENSBORO, N. C.—Worth Distilling Co., Phillip Segal president, 501 South Spring street, is contemplating enlarging its facilities.

West Virginia

RAVENSWOOD, W. VA.—City will vote Nov. 5 on $25,000 light and water plant improvement bonds.

Virginia

DANVILLE, VA.—City votes Oct. 1 on $1,513,000 power plant bonds.

MIDDLEBURG, VA.—Town voted $54,000 bonds for installing sewerage plant. Total cost estimated at $87,000.

NORTH TAZEWELL, VA.—Woodworking plant of the Federal Lumber Co. recently sustained severe damages by fire.

SALEM, VA.—Town J. J. Cassaday, town manager, receives bids Sept. 27 for the following materials: one 180-cubic foot per minute air compressor with water cooler, receiver and filter; one 50-horsepower 220 volt induction motor with starter equipment; one 30 gallon-per-minue electrical centrifugal pump and fittings; one solution feed chlorinator; three 15-kilowatt 2300 to 230 V transformers; one 5-inch air lift pump, deflector and accessories.

Missouri

ADVANCE, MO.—City, L. S. Morgan mayor, will soon call for bids for waterworks system, costing $40,000.

OAK GROVE, MO.—City plans waterworks and distribution system. Cost estimated at $60,000. Black & Veatch, engineers, 4706 Broadway, Kansas City, Mo.

STANSBERRY, MO.—Common council plans power plant and distribution system; including installation of diesel engine generators. Cost estimated at $100,000. Henrici-Lowry Engineering Co., 114 West Tenth street, Kansas City, Mo., engineer.

VANDALIA, MO.—City plans $121,000 waterworks and distribution system; has loan and grant. Black & Veatch, engineers, 700 Mutual building, Kansas City, Mo.

Oklahoma

OKEENE, OKLA.—City plans water supply system, costing $60,000. W. W. Hughes, engineer, Commercial Exchange building, Oklahoma City, Okla.

PONCA CITY, OKLA.—City commission, George F. Smith acting mayor, will apply to WPA for loan and grant for installing a 2000-kilowatt engine generator at a cost of $175,000.

Texas

FORT WORTH, TEX.—Treasury department, procurement division, public works branch, Washington, will have plans completed about Oct. 1 for United States narcotic farms building for which loan and grant of $4,000,000 has been authorized. Structures include administration building, kitchen, shops and power house. Wyatt C. Hedrick Inc., consulting architect, First National Bank building, Fort Worth, Tex.

HOUSTON, TEX.—Houston Coca-Cola Bottling Co., J. E. Evans manager, 707 Live Oak street, contemplates erecting an addition to its plant at Rusk and Rice streets.

HOUSTON, TEX.—Magnolia Aireo Gas Products Co., W. A. Sherman president, 3500 Clark street, plans doubling capacity of plant at an approximate cost of $60,000. Additional equipment will be installed at a cost of $50,000.

MESQUITE, TEX.—City, B. Galloway mayor, plans addition to waterworks and sewage disposal plant, costing $55,000. Koch & Fowler, engineers, Central Bank building, Dallas, Tex.

PETRALIA, TEX.—City, W. H. Long mayor, plans waterworks, pumping unit.

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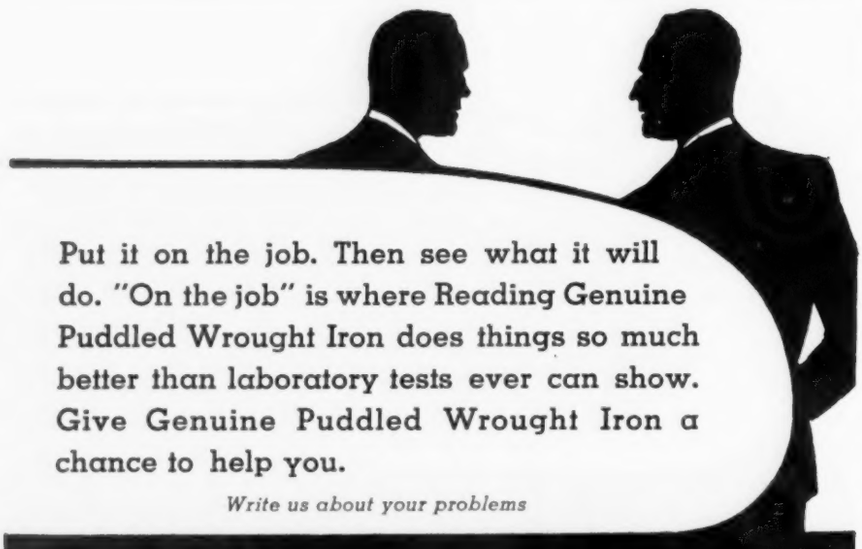

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tower, storage tank, etc., costing $50,000. J. E. Ward, Harvey-Snider building, Wichita Falls, Tex., engineer.

SAN ANTONIO, TEX.—City commission applied to PWA for loan of $7,000,000 to finance municipal power and light plant and gas distribution system.

WEIMAR, TEX.—City, H. J. Laas mayor, receives bids Sept. 30 for pumping machinery and equipment for waterworks system, including installation of deep well turbine pump complete with equipment, 125 gallon-per-minute single centrifugal service pump, gate valves, pipe specials, etc. Brandon Fitzpatrick and Emil F. Fahrenthold, engineers.

WHEELER, TEX.—City, R. D. Holt mayor, applied to PWA for loan and grant for waterworks costing $45,000, and constructing sewerage system and sewage disposal plant, costing $29,000.

YORKTOWN, TEX.—City applied to PWA for loan and grant of $150,000 for power plant and distribution system. Plans and estimates are being prepared by Garrett Engineering Co., 300 Hughes street, Houston, Tex.

Wisconsin

MANITOWOC, WIS.—Public utilities commission has applied for federal aid for increasing capacity of city light and power plant at estimated cost of $441,000. A. H. Zander is city clerk.

MARSHFIELD, WIS.—Casein Mfg. Co., manufacturer of casein products, has awarded contracts for construction of a 1-story factory addition, 25 x 40 feet.

SUPERIOR, WIS.—Philadelphia & Reading Coal & Iron Co. has started construction of a coal screening plant to cost about $30,000.

SUPERIOR, WIS.—R. C. Buick, architect and engineer, has completed plans for a 3-story addition, 88 x 140 feet, to the Superior vocational school. Cost is estimated at $190,000. Rudolph Hanson is principal.

WISCONSIN RAPIDS, WIS.—Prentiss-Wabers Products Co., maker of camp stoves, chairs, tables, etc., and other metal stampings, has broken ground for a 1-story factory addition, 109 x 130 feet. Ralph Wiltrout is vice president and general manager.

Minnesota

ALBERT LEA, MINN.—Enterprise Iron Works Inc. is offering for sale its old foundry property, consisting of a machine shop, blacksmith shop and foundry.

MANKATO, MINN. — Northwest Hemp Corp., F. E. Holton president, will install considerable machinery and equipment in the new factory being erected for treating hemp.

ST. PAUL—United States Gypsum Co., which sometime ago purchased the SiFo Products Co., manufacturer of roofing products, is taking bids for construction of a 1-story plant addition to contain 13,000 square feet of floor space.

Kansas

KINCAID, KANS.—City plans waterworks system at cost of $45,000. D. Illif, Iola, Kans., engineer.

South Dakota

PLANKINTON, S. DAK.—State, care of State Training school, Pierre, S. Dak., is preparing plans for erection of steam power plant and furnishing and installing two 100-horsepower and one 25-horsepower boilers, pumps and heaters. Cost $55,000. C. A. Trimmer, state engineer.

Iowa

HOPKINTON, IOWA—Town, A. W. McDonald clerk, voted $67,800 bonds for municipal light and power plant building, including installation of 350-horsepower engine.

MARSHALLTOWN, IOWA — Gra-Iron Foundry Corp., Jacob Eige Sr. president, has awarded contracts for remodeling and alterations to plant. Russell J. Prescott is architect.

OTTUMWA, IOWA—Dain Mfg. Co., manufacturer of agricultural machinery and equipment, has begun construction of a 1-story factory addition, 55 x 61 feet.

Nebraska

HOLDREDGE, NEBR.—Public works administration has approved $20,000,000 loan and grant to the Central Nebraska Public Power & Irrigation district for construction of a tri-country irrigation and power project. The plan calls for construction of two storage reservoirs, three hydroelectric plants, irrigation canals, and an electric transmission system.

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Public Power & Irrigation district, Walter Gibbon president, has received tentative approval of PWA for grant of about $1,000,000 for construction of irrigation project to cost about $2,000,000. Project includes dam, two canals, hydroelectric plant, and pumping plants. H. H. Henningsen, Union State Bank building, Omaha, Nebr., consulting engineer.

NORTH PLATTE, NEBR.—Platte Valley Public Power & Irrigation district, Gerald Gentleman secretary, will take bids Sept. 25 for transformers, supervisory control equipment, oil circuit breakers and other electrical equipment in connection with $7,500,000 power and irrigation project.

Montana

LIBBY, MONT.—Herbert Gold Mines Inc., William Herbert president, will soon start construction of a cyanide process mill which will have a capacity of 100 tons daily.

Pacific Coast

LOS ANGELES—North American Aviation Inc. care of E. R. Doak, 1066 Stearns drive, will start construction soon of an airplane factory at 5701 Imperial avenue, Mines field. The new plant, 300 x 300 feet, will cost approximately $300,000.

ONTARIO, CALIF.—General Electric Co., 5555 East Fourteenth street, Oakland, Calif., has started work on construction of a $25,000 foundry building 106 x 168 feet, here.

MOUNT VERNON, WASH.—Carter-Johnson Inc., 509 Second avenue, has been formed by C. R. Carter and associates, to manufacture automobiles, tractors and airplanes.

PORT ANGELES, WASH.—Bids will be opened at Washington Oct. 2 for construction of barracks, shops and garage for local coast guard air station here.

SEATTLE—Northwest Bolt & Nut Co., 4518 Fourteenth avenue Northwest, will erect a heavy frame shop building, 55 x 63 feet.

SPOKANE—Sultan Gold Mining Co. has authorized the purchase of a permanent unit for generating power, including a 150-gallon pump.

VANCOUVER, WASH.—Jobbers Petroleum Sales Co. has applied for a municipal permit to build a marine oil terminal on port property. Plans involve tanks with 200,000 gallon capacity.

Dominion of Canada

TORONTO, ONT.—Baker & Co. Inc., Newark, N. J., refiners and workers of platinum and other precious metals, will establish a branch factory here.

New Trade Publications

Shear—Cincinnati Shaper Co., Cincinnati. A catalog describing the Cincinnati All-Steel Shear, distributed for the first time at the machine tool show in Cleveland last week.

Thermostatic Bi-Metals—H. A. Wilson Co., Newark, N. J. A comprehensive review of specifications, properties and methods of application of modern thermostatic bi-metals is assembled for convenient reference in the latest "Blue Book of Thermometals."

Vibrating Screens—Vibrating Screen Co., Racine, Wis. Bulletin describing its line of vibrating screens for various uses.

Grinder—Hammond Mfg. Co., 3089 East Eightieth street, Cleveland. A leaflet announcing its No. 2 precision tool room surface grinder, with data.

Lathe—Monarch Machine Tool Co., Sidney, O. Bulletin No. 171 on its specially tooled semi-automatic engine lathe, fully illustrated.

Roller Bearings—Tyson Roller Bearing Corp., Massillon, O. A manual of cageless tapered roller bearing engineering data, with large diagrams.

Material Handling—Lewis-Shepard Co., Watertown, Boston. Folder No. 311, featuring its complete system for moving and storing materials.

Overlay Metal—Colmonoy Inc., Los Nietos, Calif. A booklet describing this wear, corrosion and heat-resistant material, with illustrations showing its application.

Rheostat and Line Switch—Udylite Co., Detroit. A bulletin on its plating rheostat and line switches for plating barrels, with illustrations and description.

Air Heaters—Surface Combustion Corp., Toledo, O. Bulletin No. S.C.-70 on its standard gas fired air heaters for drying and annealing purposes at high or low temperatures, illustrated.

Tool Room Furnace—American Gas Furnace Co., Elizabeth, N. J. A folder describing its new 16F tool room oven furnace, designed to save largely in fuel cost.

Blast Cleaning—Pangborn Corp., Hagerstown, Md. Catalog No. 200, devoted to its rotoblast cleaning unit, construction and aplication to various purposes.

Dust Control—American Air Filter Co. Inc., Louisville, Ky. Bulletin on its plan of air curtain dust control and dynamic precipitator, with illustrations and diagrams.

Mixing Equipment—Struthers-Wells Co., Warren, Pa. Bulletin No. 13 on its mixing equipment, including mixers and autoclaves, illustrated and with data tables.

Plating Barrels—Udylite Co., Detroit. A leaflet on two plating barrels in this company's line, the regular rubber-lined barrel and the handiplater, for small lots.

Arc Welders—Lincoln Electric Co., Cleveland. Two bulletins, No. 309 and 310, giving general specifications for its engine driven models SA 200 and SA 300, type S-3676 and S-3677.

Arc Welder—Hobart Bros Co., Troy, O. A booklet on the many profitable uses of 40-volt simplified arc welding, with illustrations of equipment and applications.

Metal Cutting Saw—Columbo Machine Co., 114 Liberty street, New York. A leaflet describing its hydraulic high efficiency metal cutting saw, in five sizes, with description and cutting performance.

Specialty Equipment—DeVilbiss Co., Toledo, O. Catalog SF, covering the company's line of equipment, including portable air compressors, spray guns and accessories for a wide variety of uses.

Rotary Tilting Table—Pratt & Whitney Co., Hartford, Conn. Circular No. 417 on its 10-inch tilting rotary table for its No. 1A jig borer, with illustrations and dimension table.

(*Please turn to Page* 184)

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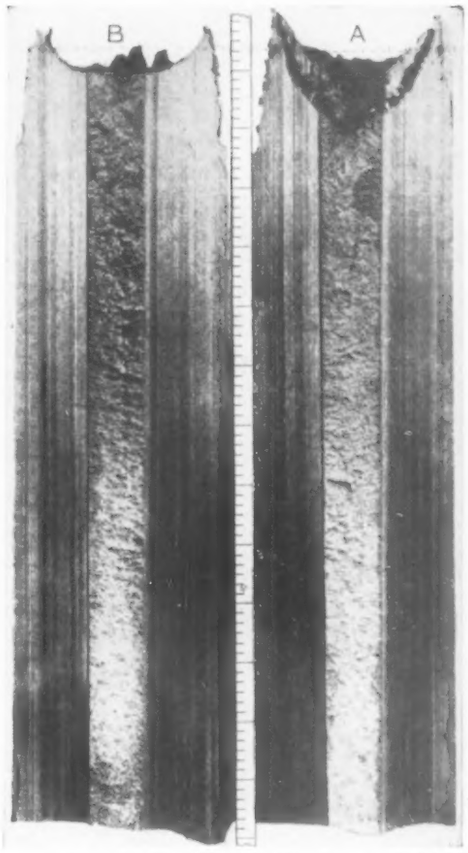

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(*Concluded from Page* 182)

Grinding Disks—Charles H. Besley & Co., 118 North Clinton street, Chicago. A bulletin on its steel-backed grinding disks, in one piece up to 30 inches in diameter, in eight pieces from 42 to 72 inches.

Furnace Blower—Emerson Electric Mfg. Co., St. Louis. Catalog No. X-573 on its furnace fans, blowers, bonnet controls and other equipment; X-826 announcing its new No. 14 furnace blower.

Belt Conveyors—Jeffrey Mfg. Co., Columbus, O. Catalog No. 610, covering its complete line of standardized conveyors and accessories, a textbook on belt conveyors, with tables to show proper conveyors for each purpose.

Indicators—Ripley Mfg. Co., Wayne, Mich. A folder describing its indicators for showing level of bulk materials in bins by lateral pressure against a diaphragm and counterweighted lever system.

Disconnecting Switches—Schweitzer & Conrad Inc., 4435 Ravenswood avenue, Chicago. Bulletin No. 222-A on disconnecting switches of easily operated multi-contact type for use where large currents must be handled.

Dust Filters—Ruemelin Mfg. Co., 386 North Palmer street, Milwaukee. A bulletin on its dust filters, with uses, processes, construction and information needed for quoting on special requirements.

Industrial Locomotives—Brookville Locomotive Co., Brookville, Pa. Bulletin No. BV-8, describing its locomotives with Ford V-8 motor, in 2½ to 6-ton models, illustrations showing details of construction.

Rust Inhibitor—Truscon Laboratories, Detroit. Bulletin No. 403 on its Bar-Ox formula 97, a penetrating rust inhibitor, with a discussion of rust growth and means for stopping its ravages.

Heavy Plate Fabrication—Treadwell Construction Co., Midland, Pa. A bulletin calling attention to the company's scope, facilities and service in the construction of various equipment to give the utmost in use.

Wire Cloth—Audubon Wire Cloth Corp., Philadelphia. Catalog No. 42 on its various types of wire cloth, well illustrated; Catalog No. 40 goes into greater detail, including list prices, specifications and tabular data.

Steam Accumulators — Foster Wheeler Corp., 165 Broadway, New York. Bulletin RA-35-5, dealing with steam storage in Ruths accumulators, equalizing steam pressure and allowing steady boiler operation in spite of varying steam use.

Drives—Gates Rubber Co., Denver. A catalog with complete instructions for design and cost determination of any drive with V-belt engineering; methods of checking tensions and effects of oil, water, steam and chemical fumes.

Thermit Welding—Metal & Thermit Corp., 120 Broadway, New York. A booklet describing the aluminothermic process of welding of heavy sections of ferrous metals, with applications to specific cases and actual cost data.

High Tensile Steel — Republic Steel Corp., Central Alloy district, Massillon, O. A reprint of an article by Howard L. Miller, Republic metallurgist, on copper-molybdenum-nickel steel, containing much information on a new product.

Speed Control—Reeves Pulley Co., Columbus, Ind. A handbook on variable speed transmission units, with reasons for variations in speed in industrial operations, and applications of the company's transmissions to various uses.

Welding — Lincoln Electric Co., Cleveland. A leaflet, illustrated, describing welding in construction work, including a penstock, bubble tower, siphons, mountain pipe line and an ocean pier. Description of each piece of construction is included.

Paper Insulated Cable — General Electric Co., Schenectady, N. Y. Bulletin GEA-1278B presenting in detail description of its four improvements in cable construction, with data; it is a companion to other General Electric cable booklets.

Die Sinking Cutters — Pratt & Whitney Co., Hartford, Conn. Circular No. 415 on its die sinking cutters designed for higher speeds and feeds, with ball end, square end and taper; circular No. 416 on stub screw machine reamers of high-speed steel.

Die Heads—Geometric Tool Co., New Haven, Conn. Three booklets on its solid adjustable die head, a new tool; class SJ solid adjustable taps; two styles of stationary self-opening die heads, a line recently considerably revamped.

Conveyors—Standard Conveyor Co., North St. Paul, Minn. Three catalogs, a general catalog, pneumatic tube systems and gravity roller conveyors, with detailed drawings, descriptions and illustrations, for engineers of industrial plants.

Nickel Scrap—Cosmo Metal Alloys Corp., 275 Front street, New York. A reference folder on scrap nickel and nickel alloy scrap, listing the commoner forms of high grade scrap, to aid in obtaining the most advantageous prices by proper separation of scrap by producers.

Blowers, Turbines—L. J. Wing Mfg. Co., 154 West Fourteenth street, New York. A miniature catalog of heating, ventilating, blower and turbine equipment, giving a bird's eye of the company's line, in the form of a calling card, used by its salesmen and representatives.

Boiler Plant Equipment—Combustion Engineering Co. Inc., 200 Madison avenue, New York. A bulletin with condensed description of all types of boilers, steam generating units, stokers, pulverized fuel systems and heat recovery equipment furnished by the company.

Insulation—Johns-Manville, 22 East Fortieth street, New York. A booklet describing a number of insulating products, entitled "Barriers to Industrial Waste." Covers heating and power, ovens and dryers, heat-treating furnaces, refinery, steel mill, smelting and many other applications.

Portable Compressors — Worthington Pump & Machinery Corp., Harrison, N. J. Four bulletins on its aero two-stage portable compressors, 105, 160, 210, and 315 cubic feet per minute of air, balanced angle, two stage, air cooled unit assembly clutch-connected to heavy-duty six-cylinder engine.

Cutters—Ingersoll Milling Machine Co., Rockford, Ill. Catalog No. 51, featuring the new zee lock cutter blade, with details of design and application to milling cutters; cone-type face milling cutters, helical end mills and helical milling cutters; tool chart showing applications and data on design, use, adjustment and assembly.

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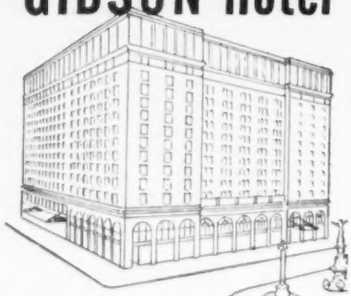

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